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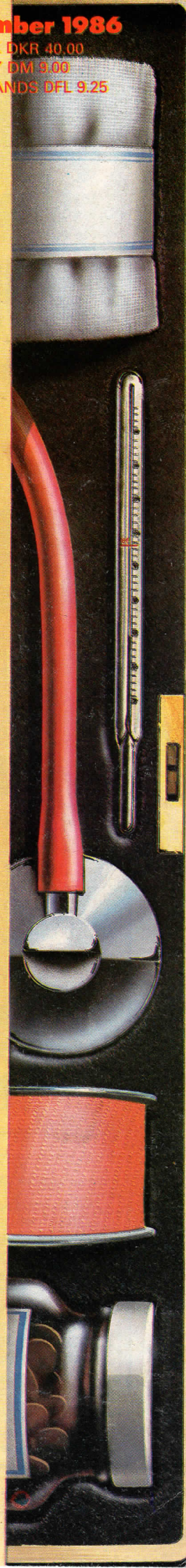
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QDISC

Now containing the complete QL Toolkit software as well as an easily used Ram-Drive device driver, the CST QDisc is the longest established and most widely used floppy disc controller for the QL computer. The QDisc interface may be used with virtually any 3.5" or 5.25" floppy disc drives including, of course, CST's dual slim-line 720K (1 Megabyte unformatted) high performance, 80 track double sided drives. The Toolkit software provides a wide range of SuperBASIC commands and functions designed to allow the full power of the QL to be realised without resorting to machine code programming, giving access to job control, random access I/O, character sets, wild card file handling and so on. The Toolkit is included in the QDisc firmware, so it is ready for use as soon as the system is switched on, as is the Ram-drive device driver, which allows any unused memory to be used as a high speed storage medium, ideal for temporary results, and for saving screen images for high speed displays. Naturally the Ram-drive may be used to maximum advantage when used on a QL with additional memory such as the RAM-plus.



Expanding the QL's memory from 128K to the maximum 640K, the CST RAM-plus is based on the latest 256K DRAMs to give full speed no wait-state operation and is housed in an elegant aluminium case which matches the QL and provides an expansion port allowing a peripheral interface, such as a QDisc floppy or Winchester controller to be plugged in. Adding high speed memory to the QL has several advantages: all QL programs run faster, including ones that make heavy use of disc or microdrive as QDos uses spare memory for buffering data; increased data space is available for SuperBASIC, Psion and other application packages and the QL's multitasking ability is greatly enhanced by the ability to load several large programs simultaneously. The extra memory can also be used to advantage with the Ram-drive firmware supplied with the QDisc. For customers who have already purchased an earlier QDisc controller, the Ram-drive software can be supplied on floppy disc at a small charge.

20MBytes!

The flagship of the CST fleet of storage devices for the QL is the 20 Megabyte Winchester drive with integral floppy drive. The system is housed in a compact metal case with integral power supply and is interfaced to the QL by a small controller card. The floppy specification is the same as the standard QDisc; the Winchester is a high performance drive unit based on the new SCSI standard, which allows up to eight drives to be connected to one QL (available to special order). The Winchester firmware is fully compatible with standard microdrive and floppy QDos drivers, and also supports hierarchical directories and file date stamping. The directory structure allows files to be separated into compartments; for example, programs can be held in one directory while data for various projects can be held in other directories. This is essential when a disc can hold over 1000 files! Date stamping of files is used to keep a record of the last time every file on the Winchester was accessed, modified or backed up. This allows the Data Management Utility supplied with the system to archive only those files which have been changed since the last backup was performed. This greatly reduces the time taken to perform regular backups.



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August 1985 onwards

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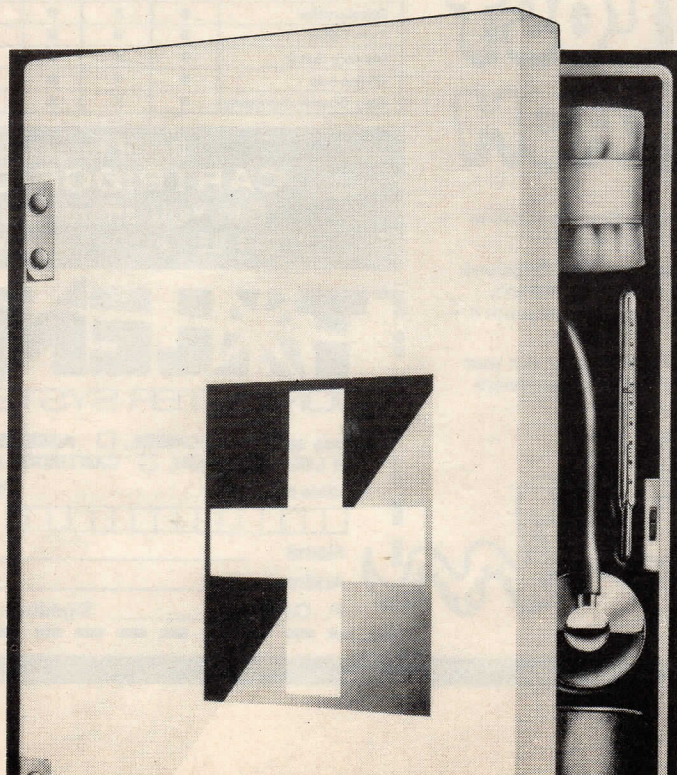
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NEXT MONTH

QL Sound Special.

We take an in-depth look at the MIDI sound interface. What is it? How does it work? Can you build your own? All these questions answered.

ABC Electronic have produced the first add-on sound board for the QL.

QL Comms.

Mike James assesses the communications capability of the QL and reviews the new Astracom 1000.

Plus

Eye-Q; Digital Precisions new graphics package, the Q-XT 640 - Sandy's QL upgrade, screen dumps compared.

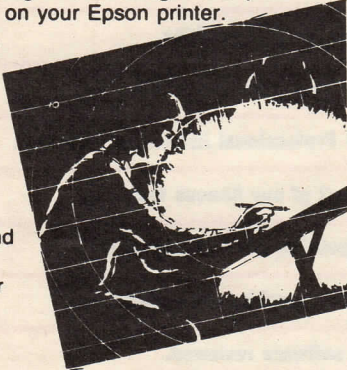
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QL SCENE

Rainbow announces keyboard

Yorkshire repair specialist Rainbow Digital Repairs has revealed that it is working on a new keyboard for the QL. Bernard Joyce of Rainbow tells *Sinclair QL World*:

"I am in the design process at the moment. I have a prototype which is almost working; all it needs is a few alterations to the matrix."

The new keyboard will, like the CST Thor upgrade, be an IBM clone with proper full-travel keys and a 2ft. wander lead. It would make the QL housing redundant other than as a processor and Microdrive box. Joyce envisages providing some kind of cover to protect the redundant plastic surface.

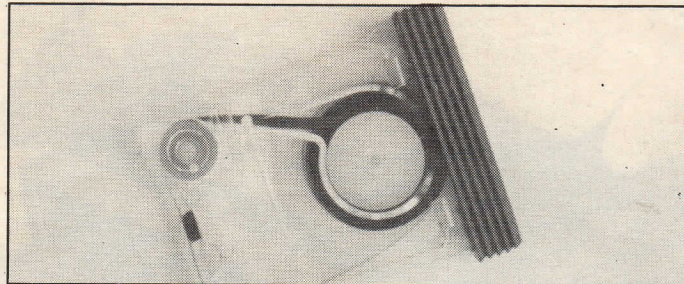
The keyboard will be manufactured by Cherry, a West German company which specialises in the production of IBM-style keyboards. Rainbow hopes to have it available this side of Christmas. The cost will be in the region of £60.

Sinclair agrees to Sale of Microdrives

Sinclair Research has finally reached agreement with Microdrive manufacturer Ablex which should free the future supply of blank cartridges.

In the Amstrad deal, Sinclair retained ownership of Microdrive rights but has been reluctant to license their production. Ablex is under licence to produce Microdrives containing only pre-recorded software.

The deal is being described by Sinclair as an interim agreement. It covers only present stocks of cartridges held by Ablex which, with demand running at more than 50,000 a month, it is estimated will last for



Microdrives, the inside story.

some three months.

Bill Nichols, of NMA Communications, the Sinclair public relations agent, says the purpose of the deal is "to end any confusion over the security and distribution of future

supplies."

Negotiations between the two companies are continuing with the aim of reaching an agreement on continued manufacture and distribution of Microdrive cartridges.

Fast utility from Qflash

West German software house Qflash has released version 3 of its RAM disc and toolkit software. Qflash claims its RAM disc is 10 times faster in operation than competitive offerings.

In addition to the version 2 features – fully-dynamic memory management, full software compatibility including the Psion packages – version 3 provides a toolkit of SuperBasic extensions and utility programs on a separate cartridge. The most notable is MDVLOAD, which copies a full Microdrive to RAM disc in 7-14 seconds.

The software is available direct from Qflash and from TK Computerware and Eidersoft in the U.K., costing £18.95. At the time of writing Eidersoft was selling version 2 without the toolkit for £9.95 as the company was still in the process of Beta-testing version 3.

Qflash

Uwe Fischer, Postbox 102121
D-200 Hamburg 1
West Germany
Tel: 010 040 7650461

T. K. Computerware
Tel: 0303 64039

Eidersoft
Tel: 0708 852647

New printers from Citizen

Printer Manufacturer Citizen is adding two new models to its range of dot matrix printers. The MSP 15E is a 136-column, wide-carriage printer, similar in specification to the Brother M1509 and Epson FX-105.

Costing £449 the MSP 15E is almost identical to Citizen top-of-the-range MSP 25 printer but with slightly

slower print speeds. In draft mode the 15E clocks a respectable 160cps, falling to 40cps in 'correspondence' mode.

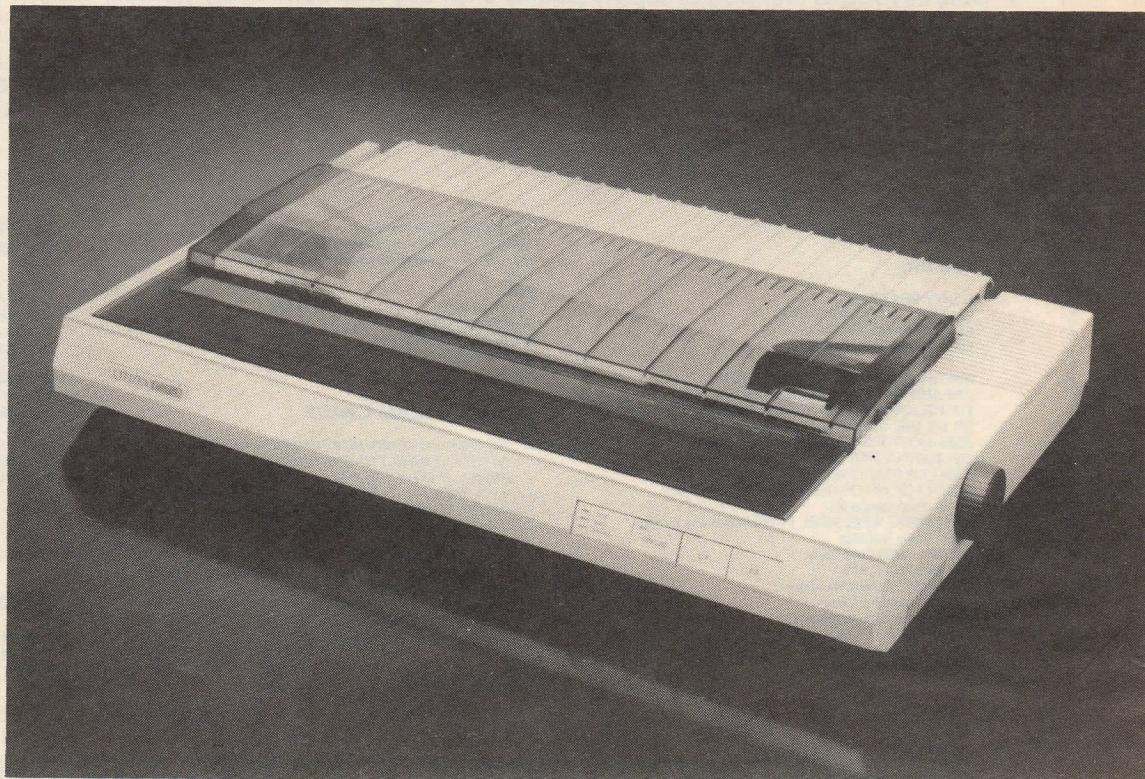
The specification includes Epson compatibility, full bit image graphics capability, optional RS232 interface and an 8K buffer.

At £1,349 the MSP-10E is an 80-

column printer with, in every other respect, identical specification. All Citizen printers are covered by a two-year guarantee.

Further information from:

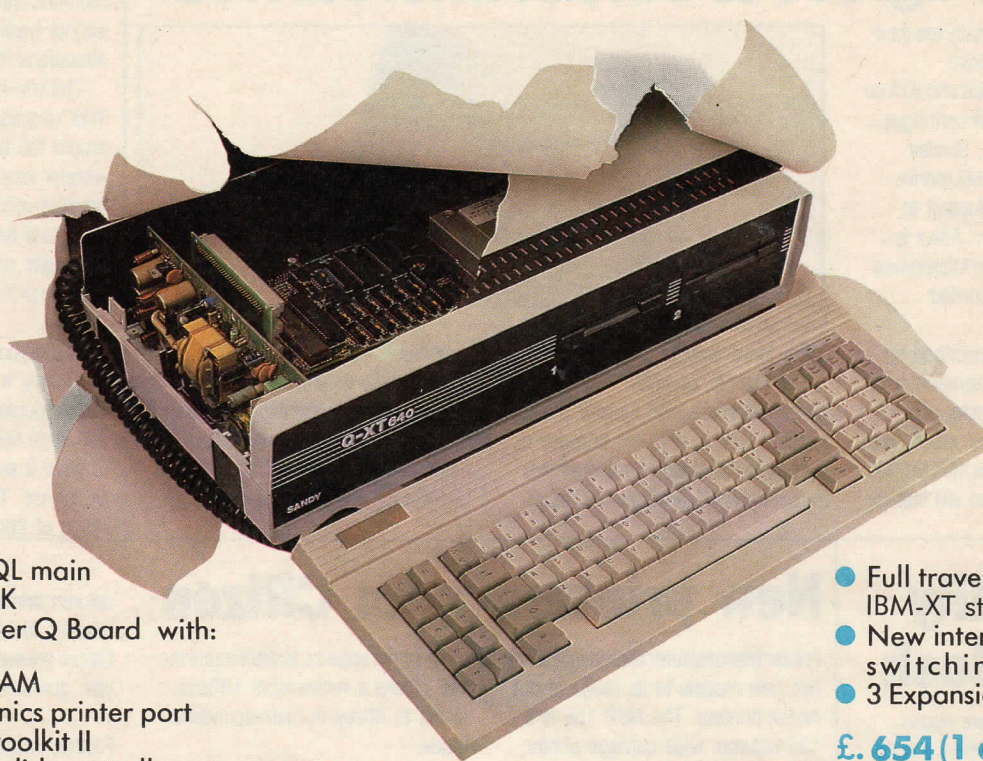
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The above can also be supplied in kit form, to upgrade your existing QL as follows: Box, keyboard and power supply (suitable for any disk controller, memory expansion card and 3.5" floppy disk drive), no soldering required, fitted in seconds.

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SUPERQBOARD

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SOFTWARE DESIGNED BY TONY TEBBY (THE AUTHOR OF Q-DOS) CONTAINS THE FOLLOWING ADDITIONAL COMMANDS
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GET BGETPUT BPUT FPOS - Direct Access Files
FLEN FTYP FDAT - File Enquiry Functions
FOPEN FOP_IN FOP_NEW FOP_OVER FOP_DIR
VIEW - Examining a file
WDIR WSTAT WDEL WDEL_F - Wild Card Commands
STAT - Drive Statistics
WCOPY - Wild Card Copy
RENAME TRUNCATE
DATA_USE - Default Directory
CLOCK - Resident Clock
EXTRAS - Listing Extensions
FLP_SEC - security level
FLP_START - start-up time
FLP_TRACK - nr of tracks

FLP_USE - microdrive emulation
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QL SURGERY

The *Sinclair QL World* guide to curing a sick micro.

A large parcel arrived in the *QL World* offices along with the rest of the morning post. As usual, we were eager to unwrap it and discover what exciting new piece of hardware had been sent for review.

It transpired that the parcel contained a QL – and a damaged one at that. There was an anonymous letter enclosed which described the fault briefly – the machine would crash after about five minutes' use. The most astonishing thing was that the owner had not sent the machine in the vain hope that we might be able to repair it but was making us a gift.

While things are not so bad that the only thing to be done with a dead QL is to give it away, it must be said that the process of putting a sick machine back on its feet is less than straightforward.

Those with the least problems are obviously QL owners whose machines are still covered by the 12-month warranty. Despite the fact that the Sinclair micro-computer business was sold to Amstrad in April, the warranty is still valid, even if you bought your machine before the takeover. Amstrad is obliged, in law, to honour the guarantee.

Hobson's choice

The question is what do you do to ensure the speediest, cheapest and most reliable repair? For owners of guaranteed machines there is only one option, unless you want to pay for the repair and that is to return it to the dealer from which it was bought. If you

have not had the machine for more than a few weeks, most dealers will replace it with a new model immediately. If the machine was faulty at the time you bought it the dealer must refund your money, though most people would be satisfied with a working replacement.

If you have had the machine for some time, though, it would be unreasonable to expect a new replacement. Under the Amstrad warranty scheme, the dealer sends your QL to a repair contractor – probably Computafix. It repairs the machine and returns it to the dealer, from whom you can collect it free.

The long wait

Where owners of guaranteed machines suffer is with the time it takes top effect repairs. Most of the repair companies included in our survey quoted turnaround times of between 24 hours and three days, whereas for guaranteed machines it is more like four or five weeks.

Boots told us that there was a six to seven weeks wait and if you bought your QL from Dixons you could be without it for as long as eight weeks if a fault develops. If you cannot afford to be without your machine for so long it might be worth considering paying for a more speedy repair.

There are laws which govern such things and if you QL breaks down there is every chance that the warranty period will have expired. In some ways, despite having to pay for the repair, you're in a better position than you might think. You can at least seek the quickest, cheapest and most reliable repair and

many dealers offer extra services you would not get with a guarantee repair.

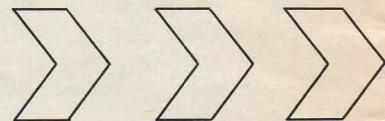
The quick reference guide shows at a glance which companies perform QL repairs, how much they charge, how long it takes and gives a few other pertinent details.

Wherever you send the machine there are a few points worth observing. First, if you can find a local

repair centre and take your machine personally you will obviously get it back much more quickly than if you trust it to the post; some places even offer a while-you-wait service for certain straightforward repairs.

If you must send you QL by post, there is no point in sending it by Recorded Delivery as there is no real advantage to be gained. For ordinary parcel post, provid-

TO FE GUIDE



In bygone days, when computers were made of wired keyboards and any number of discrete boards, fault-finding was a little easier for the layman. If a faulty board could be found it could be removed and replaced, a relatively inexpensive job.

The QL has a membrane keyboard, internally, and only one board. The memory chips are soldered-in, usually, and the Microdrive mechanism is part of the moulded case. The Microdrive recording heads are not adjustable.

Those are, of course, some of the features which permit such a powerful machine to be sold at such low cost, so we can hardly complain.

That implies that fault-finding and repair work by the knowledgeable owner is a little more difficult. One big handicap is that no circuit diagram is supplied as standard. I would suggest that unless you have a good deal of experience of repair work, a QL service manual and a very friendly custom

ing you have obtained a free Certificate of Posting, the Post Office will pay compensation for loss or damage of up to £18.

The best choice is to send the QL as a Compensation Fee parcel. That will cost an extra 70 pence but your goods are covered to the value of £350. Registered Mail provides similar cover.

There are a number of things you can do to ensure that your QL is returned to you in working order as quickly as possible. Some of the companies listed will give an estimate by telephone if you can provide them with a good idea of what has gone wrong.

The fault-finding guide should provide you with a reasonable idea of exactly where the problem lies. If you telephone the repair

centre and provide that information most of them will be ready to provide you with an on-th-spot estimate. You can then send your QL, together with a cheque, and the repaired machine will be despatched as soon as it is ready.

Carriage

It is worth noting the method by which repair companies return machines. Nearly all will send them by first class insured post but some offer the option of collection and return by courier. That will obviously have to be paid for but the saving in time may be worth it.

If you cannot afford to be without your QL for so much as a minute it may be worth considering taking advantage of one of the schemes which offer a replacement

machine while yours is being repaired. Alternatively, it may even be worth keeping a spare machine for such eventualities.

We list all the companies we contacted which carry-out QL repairs. The information provided should give a good idea of which best suits your needs. Bear in mind when choosing a repairer that cost is not everything. Also those who quote a 24-hour turnaround may not be able to honour it if certain parts are unavailable. It is always best to telephone beforehand and check.

Eidersoft charges according to the complexity of the repair. Prices range from £17 for a simple fault to slightly less than £40 for a really complicated mess. If the damage is more extensive than that – for example

if you have attempted a RAM upgrade and failed – Eidersoft would probably not be interested.

As with most of the other companies, the usual repair undertaken is to the Microdrive or video ULA, or the keyboard, and the price for that would be around £30. For £39.95 you can take advantage of the Eidersoft Business Support Service. That gives you access to the telephone hotline – instant help with problems. The company will also provide subscribers with a replacement QL while theirs is being repaired. You will, however, have to pay for its despatch – £10 by post, £18 by courier.

Eidersoft will provide breakdown insurance if you require it at a cost of £49.95. Peripheral repairs are also

TROUBLE SHOOTING

chip supplier, you would do well not to attempt to repair the QL.

You may feel more confident about a commercial repair and be able to obtain a quotation on the cost of repair, if you could be specific about the fault. If a Microdrive is not working properly, in what way(s) is it not working? If the QL keeps locking-up, is there a good reason? By

looking carefully at the options you may save yourself a repair bill. Let us consider a number of common areas of fault in the QL. The table lists faults against possible causes. The list of numbers relates to the action(s) you can take either to cure the fault or check where it lies. The related actions are listed after the table.

Fault	Cause	Check
Green/white screen on power-up or re-set	Faulty expansion port or RAM.	1,2
Large blocks/stripes of colour and possible speaker noise.	Chip or bad chip pin contact.	3
No re-set or spurious re-sets occurring.	Faulty re-set switch.	4,5
QL locks-up after specified time.	Overheating/bad contacts/noisy mains or marginal RAM	3,6,7,8
QL locks-up at random.	Noisy mains/bad contacts or marginal RAM.	3,7,8
Microdrives fail to read/write properly on a cartridge in use in one drive only.	Noisy mains or over-heating	6,7
Microdrive fails to read cartridges recorded on by other drive.	Bad alignment	9
Microdrive fails to read/write any cartridge.	Over-heating/bad pin contacts or faulty drive.	3,6,9
Certain keys – not usually the complete set – fail to operate.	Faulty keyboard membrane.	10

1. Remove any expansion module and check operation. If fault is cured the expansion module is faulty or requires too much power from the QL.
2. External RAM is faulty. Treat as for 1.
3. Bad chip in contacts can be checked and cleaned only by removing all possible chips – not ones soldered in – from main board. Do not perform this unless confident and obey all normal rules regarding static-sensitive devices.
4. Re-set switch has been damaged by upward pressure while using it. Check state of switch by removing QL lid.
5. Power plug connections are weak through too much use. Replace or hard-wire power lead.
6. Over-heating. keep away from direct sunlight and other heat sources. Do not cover vent holes. Remove expansion boards to see if they are drawing too much power from the QL. Place small silent fan behind r.h.s. of machine or, if confident – and as last resort – remove regulator and heatsink to outside of case.
7. Noisy mains supply. Rectified easily by using proprietary suppressor plug or module – see advertisements in this issue.
8. If QL contains marginal or 'lossy' RAM, a full RAM test will be needed to check operation of RAM. See next month's technical help column for appropriate program.
9. If Microdrive heads are mis-aligned there is little hope of cure except by a complete replacement by a repair centre. Check first that your TV/monitor is not near the Microdrives as that could have the same effect.
10. Faulty keyboards are best left to repair centres.

Note: If you feel that an expansion module is drawing too much power from the QL, your only hope of cure is to buy an expansion box, usually 2-way, which has its own power supply. It plugs into the expansion port and expansion modules are then plugged into the box.

undertaken as well as JS ROM upgrades. Telephone for further details.

Capital Computers: Although Capital Computers operates a standard-charge system for other machines, it does not do so for the QL. The reason given was that the QL uses 'more obscure' parts. Capital, therefore, take QLs on estimate basis, you telephone when the company has looked at the QL and you are told how much it will cost. That could be anywhere between £5 and £28.

Capital reckons to have your QL back in the post within 72 hours of receiving it and claims a 24-hour turn-round on some jobs. A three-month guarantee is provided and should you need to take advantage of it, Capital will refund the postage. The Capital guarantee is more comprehensive than most in that it covers the complete machine, not just replaced parts and labour.

Computafix was the warranty repair agent for Sinclair and claims to be the biggest home computer repair centre in Europe, repairing some 3,000 machines a day. It will repair your QL in 48 hours and return it by insured post. There is a standard charge of £ no matter what the problem and that includes a standard three-month guarantee on parts and labour.

The Computer Repair Centre: If you take your QL to the Centre it will give you an on-the-spot estimate which will usually be between £25 and £29. Otherwise you could post it and pay the standard repair charge of £29.95. Machines are returned in two to three days and the work is guaranteed for three months.

Chromasonic Computer Centre: Chromasonic says it can repair about 70 percent of the QLs it receives; the other 30 percent go to a sub-contractor. The reason is that certain parts are difficult to obtain – a not uncommon complaint. Major compo-

nent supplier CPC, however, said that parts present no difficulty.

It seems more likely the problem is one of the delay arising from reluctance of dealers to stock numbers of the more expensive QL components and then running out. Anyway, if it can, Chromasonic will repair your QL for £29.00, including a three-month guarantee on parts and labour.

Mancomp: The price for repairs in Manchester is £20 to £40. If you walk through the door with a sick QL

think has gone wrong. You will then receive an estimate by telephone and you can enclose a cheque with the machine. That way your computer will be despatched by insured post within 24 hours of receipt. Mancomp guarantees all work for three months.

Rainbow Digital Repairs: The minimum repair charge is £17 for a keyboard fault. It rises to £30 for any other electronic problem to a maximum of £37.50 for Microdrive replacement. All prices include

age, packing and insurance. If you telephone and describe the fault you will receive an estimate. All work is guaranteed for three months.

Videovault is another Manchester company. While it admits to carrying-out QL repairs it must be said that it seemed less than enthusiastic. It said its ability to repair a QL depends largely on whether it has the parts and can trace the fault. If that does not deter you the £50 standard charge probably will. If Videovault can repair your machine, it will do so the same day and return it by insured parcel post.

Quantum has been in the business of repairing Sinclair machines for about three years. It has a fixed labour charge of £12 and parts are extra. An everyday fault would probably cost £20 to £25. Quantum can do over-the-counter repairs, or the usual postal deal in three days.

Zedem: This Bedford-based company has a slightly different approach to charges. It quotes a standard charge of £24.95 including postage. Often the cost will be less but if it is more you will be told before continuing. The usual turn-round time is two to three days but, once again, if parts are in short supply it could take as many weeks. One thing which sets Zedem apart from the other repair centres is that it offers a six-month guarantee on all replaced parts.

The important thing to remember is that getting a good deal on repairs is like buying anything else – it is worth shopping around. Telephone companies before parting with your QL, if only to check on availability of parts. By referring to the troubleshooting guide and describing the fault, you can get a good idea of cost as well, as expediting repair. It is pointless being without your QL for longer than is necessary and the more you can reduce waiting time the better.

QL REPAIR CENTRES

Eidersoft,
The Office, Hall Farm
North Ockenden
Upminster, Essex
RM14 3QH Tel: 0708 852647

Capital Computers
Unit K2, Cardiff Workshops
Lewis Road, East Moors
Cardiff CF1 5EG
Tel: 0222 614401

Computafix
Orbany Park, Primley Road
Camberley, Surrey
Tel: 0276 66266

Computer Repair Centre
28 College Street
Worcs. WR1 2LS
Tel: 0905 41072

Chromasonic
48 Junction Road, Archway
London N19 5RD
Tel: 01 263 9493/5

Mancomp
Printworks Lane
Levenshulme
Manchester M19 3JP
Tel: 061 224 1888

Rainbow Digital Repairs
Clark House, Haxby
Yorks. YO3 8HU
Tel: 0904 768853

Suredata
Canons Park, Edgeware
Middx. HA8 6TQ
Tel: 01 951 0124

Videovault
140 High Street, Glossop
Tel: 04574 66555

Quantum
33 City Arcade
Coventry, Tel: 0203 24632

Zedem Computers
2 Kimbolton Road, Bedford
MD40 2NR Tel: 0234 213645

under your arm, and if Mancomp has the parts, it reckons to have you walking in the opposite direction with a cured machine inside an hour. That must be something of a record.

Send it by post and you will receive a telephoned estimate before the company carries out the repair. If you are in a hurry, refer to the trouble-shooting chart and tell Mancomp what you

VAT and return insurance and postage. Those who cannot wait may consider paying the extra £15 to have the machine collected and returned by courier.

Rainbow also provides JS ROM upgrades. It charges for DIY kit and £30 for the replacement.

Suredata has no standard charge but, on average, repairs cost between £25 to £30 including post-

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Ram Disc (Ram Disk & Utilities)	£14.95
QL User Recommended	
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QL User Recommended	
Touch Typist	£11.50
Integrated Accounts (Sagesoft)	£79.95

Add On's

512k Expanderam (Miracle Systems)	£119.95
Including Ram Disc	£127.50
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C.S.T. Interface	£82.95
C.S.T. Plus Expanderam	£200.00
As above Plus/Dual 3.5" Drives	£399.00
Citizen 120D Printer (Including Leads & Quill Install)	£199.95
Astrocom Modem (Ex Brightstar)	£194.95
Sandy 512k Super QBoard	£245.00

All Prices include Vat and Post & Packing (in UK). Phone for full price list or quote on other items, or details of discounts on large orders.

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QL COMMUNICATIONS

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PLUS

- * QL to QL file transfer. Any file transferred from disk or microdrive, including executable files, Quill documents, etc.
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- * State modem type when ordering if not 25 way connector.

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- * The Prism Modem 1000 is a B.T. approved, manual dial modem that operates at 1200/75 full duplex or 1200 baud transmit only.
- * This package provides all the hardware and software you need to connect your QL to Micronet, Prestel, BT Gold or any other 1200/75 baud service. It also allows QL to QL file transfer at 1200 baud.

VOYAGER 7 MODEM with Modaptor & Software £129.00

- * This package enables you to use 300 baud full duplex as well as 1200/75 and 1200 transmit. Manual dial, BT approved.

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QCODE

42 Swinburne Road Abingdon OXON OX14 2HD
Telephone: 0235 28359 (9.00 am - 8.30 pm)

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I'd like to know more about Tandata communications for the QL.

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O P E N

Printing Quill

I am prompted by letters from Messrs Yamaguchi, Knife and Singer in your July issue to write regarding the means of controlling printer output from Quill, Abacus and Archive by use of embedded codes. They are codes which will appear on the screen but before being passed to the printer from the QL will be translated into control codes similar to those for bold, underline and the like which are already part of the programs.

The codes are created by use of the abundant translates within the install_bas program in versions 2 and 3 of the software. First select a character which you are sure you will never want to appear on paper. All the characters with ASCII codes greater than 127 and less than 182 are good bets in this regard.

Enter this character into the translate followed by the control code which you wish it to imitate, which you will find in your printer handbook. I have an Epson RX-80 F/T so if I enter the following into my printer...

dat;
Translate 2: 165,27
it translates <CTRL SHIFT E> into <ESC>. In the Epson, I can therefore get enlarged text by typing <CTRL SHIFT E> followed by <W1>. Text will be enlarged until I enter <CTRL SHIFT><W0> or another suitable translate code.

By the use of these codes I have been able to create enlarged or condensed, italics, elite or pica-sized, emphasised or double strike. I can also control line spacing locally to 1/8in., 7/72in., n/72in., 1/6in. or n/216in. where n is the

number of the code of the character immediately following the embedded code. For instance, <CTRL SHIFT·E><3><L> gives 1/2in. line spacing until <CTRL SHIFT E><2> re-sets to standard 1/6in. spacing.

It is also possible to call-up the character generator which gives access to some potentially-useful symbols. One word of caution, however, is that the positioning of the codes on the screen can lead to disruption of the margins and justification of the printed text but a small amount of trial and error will soon correct that.

Of course, you must remember that if you are using enlarged text the line on the screen may not fit on one line of the paper but I use enlarged mostly for headings which usually fit well.

The use of Quill in my work has been greatly enhanced by using these codes, since I can now control line spacing so that pre-printed forms with awkward spacings can be filled in with all my answers in the proper place. I also find that printing spreadsheets from Abacus in condensed mode means that more of the sheet can be fitted on to the page.

John McKevitt, Newbury.

Bug-hunting

Having broken the rule of back-up which, of course, I never do, I started to load a Quill.doc containing some creative work. After a minute, up came File i/o incomplete which made me try to look up what it meant. I have yet to find that it means anything other than that the cartridge is willing to keep it listed but, neither by loading, merging nor

copying will it ever let it out again. Nothing wrong with the tape. Three more bugs:

One cartridge has a random ability to underline any entire Quill file. That I can side-step by re-loading. Sometimes the listing is underlined but not the mdv2_ heading. Ask for a re-listing and this time only mdv2_ is underlined. Each of those conditions shows me whether or not a loading will be underlined or not.

Quill tells my Brother HR10 to head every sheet with an underlined @. All my reading for a remedy fails me.

Recently I have added a through port MSL 512K Expanderam and wallow in piles of memory. This gem is adding UHF not screened out by any shielding, with the result that light snow pervades the VDU together with raster lines when winding some Microdrives.

At that moment of truth when I re-set, the milliseconds of the remaining display are as clear as a new £5 note, suggesting that earth or grounding is not all it might be. I am not willing to suggest it is the MSL plug, as there always was a little snow. Because of practicalities in our household, we work on any one of three TV sets, not a monitor.

Apart from all that, I am a very happy QL person. Is there any hope with my bugs or must I just scratch?

**Roy Myers,
Northampton.**

The file I/O incomplete error usually occurs when you try to save a document to a nearly full Microdrive. You should be able to recover at least part of the document by merging. It sounds as if you are using the wrong printer driver for the HR10.

Readers help

In the June edition of *QL World* you published my letter which requested some help in writing a program for our rent returns/petty cash transactions. I would like to thank you for publishing it and to say we had an overwhelming response from readers.

It is very gratifying to know that there are so many who are willing to give their time and expertise to help those who are less fortunate than themselves, so perhaps you could publish this letter as I may have neglected to reply to them all.

We would like to thank all those who wrote or telephoned with offers of help and to say that a program is now being written for us and should soon be in operation.

**The Parkview Society Ltd,
Torquay.**

Mail order

My firm has maintained a very strong position in the mail order market for almost four years, by taking great pains to give our customers cause to trust our service. For this reason, I hope that readers will feel able to accept two points of guidance from us.

First, if you have cause to return goods for a refund, sending them by recorded delivery is a waste of money. The Post Office pays compensation of up to £18 in respect of goods lost in the ordinary mail, whether the package was sent RD or not.

The important point is to ask the Post Office for a certificate of posting, which is issued free. If the goods

C H A N N E L

are then lost, the certificate enables you to prove that you posted them and, in those circumstances, under the Mail Order Code of Practice of the Advertising Standards Authority, the firm to which you returned them must pay compensation and refund your postage costs, even though it has not received them.

If it does not, you can complain, without charge, to the ASA, which can threaten to ban that firm's advertising unless it pays. Of course, it would be reasonable to provide the firm with a photocopy of the Certificate of Posting, so that it, in turn, can chase the Post Office for its compensation.

If the goods are worth more than £18, you have two choices. You can send them as a Compensation Free parcel, which is cheap, and takes only two working days, or as a Registered Letter, which is often quicker but more expensive.

The important point is do not bother with recorded delivery, which gives you no additional benefits in these circumstances.

**Harry Whitehouse,
Newark.**

Star letter

I am a research student working in dynamical astronomy at Liverpool University and so I was particularly interested to read the final instalment of John Dice's series on astrology on the QL. My first reaction was to dismiss the series as just more superstitious nonsense but, putting aside my astronomer's prejudice, I have to say that this instalment was very informed and lucid. I would like to add a few remarks on my own.

First, as Dice makes clear, the mathematics of planetary motion is very complex but numeric integration is not the simple alternative he suggests. The theory and practice of numeric integration has been the subject of many textbooks on astronomy and it should not be approached in the light spirit which characterises Dice's account of it. To say that an integration covering one million years of outer planet positions will take a week on a QL begs the question of how to write such an efficient integration program in the first place.

That brings me to my second comment. Dice refers to *Astronomical Papers for the American Ephemeris, volume 22* for information on numeric integration. Most readers will find it difficult, if not impossible, to obtain copies of *APAE* unless they have access to the library of a university or of the Royal Astronomical Society.

A better source of information on dynamical astronomy at all levels, especially with regard to the use of computers, is the two-volume *Astrodynamics* written by Samuel Herrick and published by Van Nostrand Reinhold. I would recommend the book to anybody who wants to know more about the mathematics of planetary motions.

Another excellent reference is *Explanatory Supplement to the Astronomical Ephemeris* which is mentioned by Dice in his article. I recommend that, too, but I am afraid that it is now out of print and so it is unobtainable from HMSO. Any good library, however, should be able to obtain a copy on request.

If you want only the positions of the planets in an

easy-to-use form the best reference is the *Connaissance des Temps* which is published annually by the Bureau des Longitudes in Paris. It gives the co-ordinates in the form of Chebyshev series which are ideal for use with a computer.

I look forward to seeing more articles like Dice's but perhaps under the heading of Astronomy next time.

**David Harper,
Dept. of Applied
Mathematics and
Theoretical Physics,
Liverpool University.**

Progs paucity?

Why are most of the programs featured recently in The Progs not being made available via Microdrive Exchange? Are you planning to bring this service up-to-date?

M.H. Hudson, Matlock.

There is room only for a limited number of programs on Microdrive Exchange, so we try to include the best.

Also, authors are given the option of inclusion in Microdrive Exchange in return for a reduced publication fee.

8056 printers

I bought a QL from Dixons with a 8056 serial printer. As many of your readers will have this combination, I would like to offer some information and advice to users. Install as:

PORT: ser1
BAUD RATE: 1200
PARITY: NONE
LINES/PAGE: 66
CHARACTERS/LINE: 80
CONTINUOUS FORMS: NO
END OF LINE CODE: CR, LF
PREAMBLE CODE: CAN

POSTAMBLE: NONE
BOLD ON: 27,87,1 or 16,57,1 or ESC,W,SOH
BOLD OFF: 27,87,1 or 16,57,0, or ESC,W,NUL
UNDERLINE ON: 27,45,1 or 16,2D,1 or ESC,_,SOH
UNDERLINE OFF: 27,45,0 or 16,2D,0 or ESC,_,NUL
SUBSCRIPT ON: NONE
SUBSCRIPT OFF: NONE
SUPERSCRIP ON: SI
SUPERSCRIP OFF: DC2

The preamble code is not needed but the one given clears the buffer and re-sets the printer.

The 8056 is not capable of sub/superscript. This example uses Quill superscript setting to generate compressed (136 char) text. On-screen this is smaller and so gives the impression of Quill having compressed text. It can be used for part of the whole of a letter and does not use any Quill characters. If you print all text regularly in compressed it may be better to use this method:

TRANSLATE 1 #,SI
TRANSLATE 2 *,DC2

To turn compressed text on type # {hash} and * {asterisk} to turn it off. That way the text will appear normally on screen.

Although the 8056 can use either sheet or roll paper the continuous form option is set to NO. When a page is printed it will wait before printing the next page. That means that the results can be checked before the machine prints over pages of the expensive thermal paper incorrectly.

M Becket, Barnsley.

BETTER BASIC

The QL has one of the most powerful Basic dialects available on any small computer, so it is only proper that *Sinclair QL World* should have a regular feature devoted to SuperBasic. Whereas The Progs will contain whole programs and there will be other features involving SuperBasic programming, this section will concentrate on short, useful SuperBasic routines for incorporation in your programs and on good programming technique.

To start the series, there is a simple but effective technique for writing programs without line numbers.

When, switching-on the QL, the user selects TV or monitor display mode and the computer attempts to load a program called BOOT on Drive 1. That is undoubtedly a useful feature but it is not so helpful as it might be. A Microdrive might contain more than one frequently-used program but they cannot all be called BOOT.

The routine in listing one offers no fewer than six options on starting-up. It is not a program in the accepted sense and, once run, it ceases to exist. The advantage is that it is loaded very quickly and it uses no space in the Basic storage area of RAM.

The technique works because Qdos saves all files in ASCII format and because the QL does not care from where its instructions come. It is possible to save a series of commands, without line numbers, in a Microdrive file. When that file is loaded or merged, those commands are carried-out as soon as they are interpreted by SuperBasic and they are then lost, just as if the command had been entered on the keyboard. A file can contain a mixture of direct commands and proper numbered program lines and the computer will store the program lines correctly and carry-out the direct commands.

Unlike most Basics, SuperBasic makes minimal

reference to line numbers. They are essential only for RESTORE statements, to identify user-defined procedures internally and to differentiate direct commands from program lines. GOTO and GOSUB also need program line numbers but they are clumsy and superfluous

commands which are best ignored. SuperBasic is only half a step away from doing without line numbers altogether and one wonders if they were retained only to make the listings look familiar to Basic programmers.

It is not possible to create a file of direct commands

Listing 1.

```
100 DEFine PROCedure bootmaker
110 DELETE mdv1_boot
120 OPEN_NEW#3,mdv1_boot
130 PRINT#3; "CLS#2: PRINT#2; 'Hello...'"
140 PRINT#3; "IF DATE < BeB: PRINT#2; 'Clock not set'; ELSE: PRINT
#2; DATE#"
150 PRINT#3; "PRINT#2; 'Select:-'"
160 PRINT#3; "PRINT#2; 'F1 LRUN mdv1_EDITOR'"
170 PRINT#3; "PRINT#2; 'F2 LRUN mdv2_BOOT'"
180 PRINT#3; "PRINT#2; 'F3 LRUN mdv1_program'"
190 PRINT#3; "PRINT#2; 'F4 List mdv1_directory'"
200 PRINT#3; "PRINT#2; 'F5 List mdv2_directory'"
210 PRINT#3; "PRINT#2; 'ENTER = Fresh start'"
220 PRINT#3; "REPeat loop: key = CODE(INKEY#(-1)); IF key > 231 OR
key = 10: EXIT loop"
230 PRINT#3; "IF key = 232: LRUN mdv1_editor"
240 PRINT#3; "IF key = 236: LRUN mdv2_boot"
250 PRINT#3; "IF key = 240: LRUN mdv1_program"
260 PRINT#3; "IF key = 244: DIR mdv1_"
270 PRINT#3; "IF key = 248: DIR mdv2_"
280 CLOSE#3
290 END DEFine bootmaker
```

and expect it to run in all respects like a normal program. Each statement must be capable of being carried-out directly and therefore DATA and READ statements, user-defined procedures and multiple-line IF... THEN, REPEAT and FOR... NEXT structures are not allowed.

Listings one and two show how this unusual feature of the QL can be put to good use. The first is a routine to construct a BOOT program and the second is a user-defined replacement for the SuperBasic SAVE command.

The BOOTMAKER procedure – listing one – begins by deleting the previous BOOT file and opening a channel to a new BOOT file. The file is filled with a series of statements before being closed. When the completed BOOT program is run, the computer passes the time of day with the user, displays the time – or warns that the system clock is not set – and then offers a menu of options. The user can choose to load one of three programs – see directory listings for either Microdrive, or start programming with a “clean” computer.

Of note are the IF... THEN and REPEAT structures. Both are of the short,

single-line form and are thus acceptable to the interpreter. Line 140 tests the internal clock; if DATE returns a number higher than 8e8 then the clock is assumed to be set correctly. DATE is a function which counts the number of seconds since midnight on January 1, 1961; 800 million seconds equates to some time on the evening of May 9, 1986 and therefore represents a reasonable test of whether the clock is set correctly or not.

Once the menu has been printed, the routine enters a REPEAT loop to test the keyboard and escapes only if a function key or the ENTER key is pressed. Function keys pressed with ALT, CTRL or SHIFT have the same effect as ENTER but they could be used to increase the number of menu choices available.

The filenames shown in lines 230 to 250 will, of course, need to be changed to represent files which exist. Other options worth considering are to change the window settings, send a file to be printed or back-up a file – using INPUT to obtain a file name. If the routine becomes too complicated, it might as well be loaded as a program.

Listing two shows a replacement for the SAVE command. SAVE is not

Listing 2.

```

300 DEFine PROCedure STORE
310 LOCAl drive, name$, file$
320 PRINT#0, 'STORE current program...'
330 INPUT#0, 'Enter file name >' ! name$
340 FOR drive = 1, 2
350 file$ = 'mdv' & drive & '_' & name$
360 DELETE file$
370 OPEN NEW#3, file$
380 PRINT#3, "CLS#0: PRINT#0, 'LOADING " & name$ & "'
390 PRINT#3, "1 REMark File saved :- " & DATE$
400 LIST#3, 2 TO
410 PRINT#3; "CLS#0: PRINT#0, " & name$ & " LOADED..."
420 CLOSE#3
430 NEXT drive
440 PRINT#0, 'STORE complete' 450 END DEFine STORE

```

particularly friendly because it is cumbersome to use, especially if previous files are deleted and a back-up saved on another Microdrive. A typical saving operation might look like this:

```

DELETE MDV1_FILE
SAVE MDV1_FILE
DELETE MDV2_FILE
SAVE MDV2_FILE

```

a total of 60 keypresses, including four ENTERs.

STORE, then, has the following advantages. it takes the pain out of deleting, saving and backing-up program files; it provides an on-screen prompt during loading and it date-stamps the program so that you know when you last amended it – not bad for a 15-line procedure.

Placing direct commands in program files has a disadvantage in that there is no longer any difference between LOAD and LRUN and between MERGE and MRUN. The example in

listing two will not run automatically when it is merged or loaded. To overcome that weakness, add a direct RUN command immediately before the file is closed, i.e.:

```
415 PRINT #3, 'RUN'
```

STORE should be entered, tested and then re-numbered with very large line numbers so that it can be merged into programs being developed without over-writing other lines. While the procedure could be modified to take parameters representing start and end-line numbers, which are optional with the SuperBasic SAVE statement, it is unlikely that refinement would be worth the effort.

This article has not exhausted the uses for creating program lines and placing direct commands in program files. Other applications of these techniques will be dealt with later in the series.

KEYWORD OF THE MONTH

TO is a versatile and surprising little keyword with no fewer than seven uses. It is used most frequently to indicate a range of numbers, as in these examples:

```
FOR X = 1 TO 50
SElect ON X = 10 TO 22
LIST 100 TO 199
```

It is also found in PRINT statements to indent the printing of a string. This is mentioned briefly but incompletely in the User Guide. Here are the facts. The first two lines below are identical in effect, the third is rather different:

```
PRINT TO 10; "HELLO"
PRINT FILL$(" ",10);
"HELLO"
AT 2,10:PRINT "HELLO"
```

The first two lines fill the space to the left of the string with spaces, whereas the third prints directly from the position specified in the AT command. The difference is made obvious by changing the STRIP colour or by activating the UNDER option.

Any value can follow TO without causing an error but the interpreter treats irrational values in strange ways. Any number equal to or less than the current print position causes a single character space to be printed. That is slightly annoying at the beginning of a line, where:

```
PRINT TO 0; "HELLO"

```

prints the string beginning at the second character space

on the line. Numbers greater than the line length force a line feed. Fractions are rounded to the nearest whole number.

TO also appears in COPY statements, LINE commands, the turtle graphics TURN to command and the dreadful GOTO command. With such ubiquity it is not surprising that the interpreter can become a little confused. In many cases TO can replace a comma with no ill-effect.

```
Try this:
WINDOW 200 TO 100 TO
30 TO 50
```

While it might not produce an error, it is obvious nonsense. If a procedure, however, was defined to print a range of

numbers, like this:

```
100 DEFine PROCedure
WRITE (START, FINISH)
100 FOR x = START TO
FINISH: PRINT !X!
120 END DEFine WRITE
```

It could be called with either of the following statements:

```
WRITE 1 TO 50: WRITE
5,10
```

In that example, using TO increases the readability of the statement.

Commas and TO are not completely interchangeable. For example, these statements have very different effects:

```
FOR X = 1 TO 10: PRINT X
FOR X = 1,10: PRINT X
```

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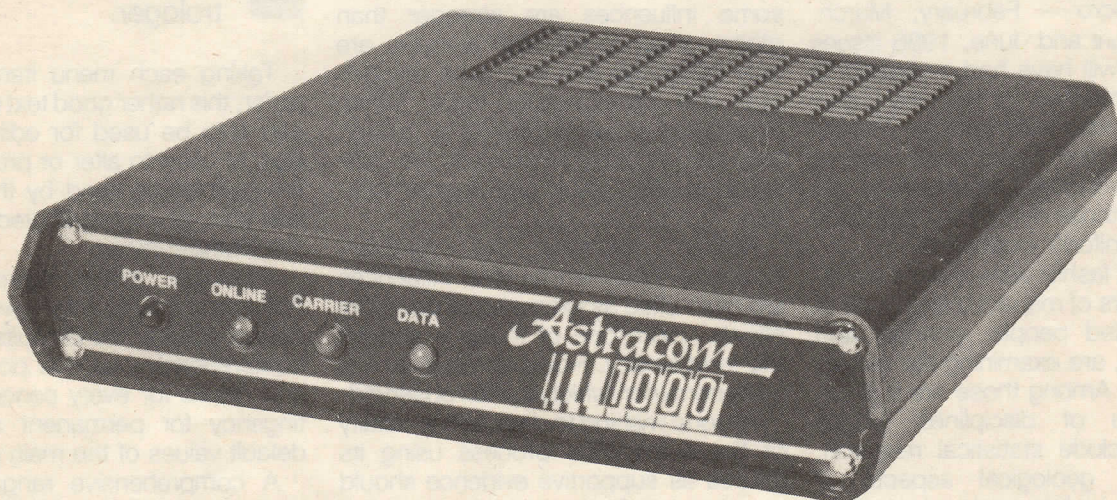
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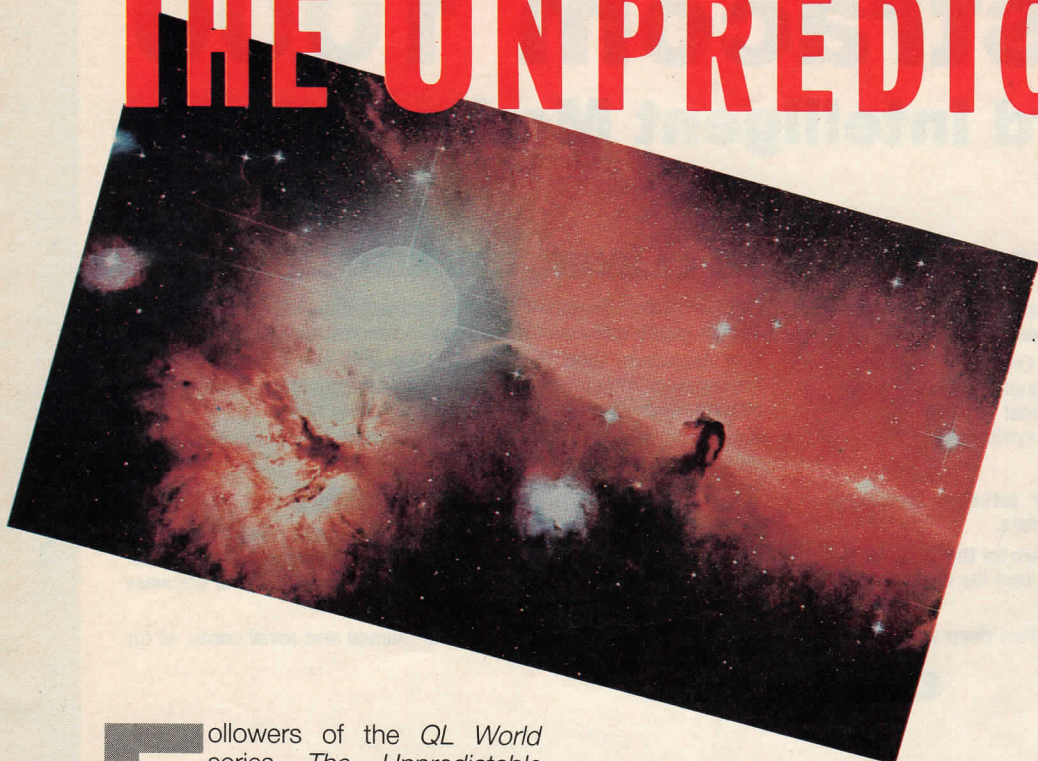
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THE UNPREDICTABLE MICRO



Followers of the *QL World* series *The Unpredictable Micro* – February, March, April and June, 1986 issues – will have had a chance to prepare themselves for the new Digital Precision blockbuster release, *Professional Astrologer*. Newcomers wishing to acquire additional background will find reading those reports by John Dice and Phil Staniforth worthwhile.

Fanciful or fashionable notions aside, large numbers of respectable groups of serious-minded people, scientist and layman alike, are examining the validity of astrology. Among those are a diversified range of disciplines whose concerns include statistical research, vulcanology, geological aspects of earthquakes, biology and meteorology, to name a tiny sample.

Common factor

Michel Gauquelin, a noteworthy French statistician, in his book *Astrology and Science*, observed from a sample of 25,000 births throughout Europe in a 20-year period that a significant number of individuals had achieved prominence in particular professions with a common factor – certain planetary configurations were evident at the time of their births which were relevant to particular professions, where either prominence or notoriety was achieved. Encouraged by his findings, he has continued, as have others, in an attempt to verify or refute his findings, to increase his database by a considerable margin.

An honest astrologer presents his craft as if planetary influences, to use an analogy, were like a tide. Although

some influences are stronger than others, they, in the final analysis, are only influences and not some mysterious and unopposable force. When astrologers speak of 'malefic' or 'ruling', they are generally referring to the conventions observed in astrological notation.

Rather mundane but pertinent examples of extra-terrestrial influences are often cited as examples of planetary effects. From one of those is derived the term lunacy. However derisive, it is a phenomenon which is often observed.

Anyone wishing to dispute the validity of the astrological process using its failures as supportive evidence should examine weather reports as viewed in a historical perspective. In spite of all the expensive technology providing a method of prediction for an entirely physical phenomenon, its frequency of inaccuracy leaves much to be desired.

The *Professional Astrologer* has evolved from the *Super Astrologer* series of programs; it has been expanded to provide the most comprehensive system available for any present or foreseeable micro – and most of the minis. When up and running the rather spartan menu produced by the boot gives little indication of the feature-packed programs available, which must be experienced to be believed.

The initial options from the first boot menu for the complete *Professional Astrologer* package, which is accessible in modules, are the *Astrologer* program, the *Astronomy* program, the *Defaults* editor and the *Text* editor.

Who could have foreseen that Digital Precision would launch an enhanced and expanded version of *Super Astrologer* on an unsuspecting universe. Ron Massey reviews *Professional Astrologer*.

Taking each menu item in reverse order, this rather good text editor, which can also be used for editing any text files, is used to alter or produce any of the text tables used by the programs and from which is gathered the data for the interpretations.

Although both *Astrologer* and *Astronomer* have their own temporary default editors, the *Defaults* Editor is as comprehensive as it is possible to be and caters for every conceivable contingency for permanent alteration of default values of the main programs.

A comprehensive range of printer types can be installed for both character, with the facility for printer re-definition of each QL character, and graphic printing, in single- or double-density for either 8- or 9-wire printing heads; planetary symbols (glyphs) may be displayed in either red or white; arcs may be displayed as either decimal or sexagesimal values.

Pertinent to the *Astrologer* program, users can customise symbol representation according to personal or preferred conventions. Full editing of any of the glyphs used customarily in astrology, such as the *Planetary*, the *Signs* or the *Aspect* symbols is implemented.

Any one of six House systems may be installed as the default value displayed in the natal charts and can be altered temporarily from within the *Astrologer* default editor. Remaining within the mainstream of astrological practice, *Professional Astrologer*

includes Placidus, Equalised, Equal House, Koch, Regiomantus and Campanus as its house options.

Of particular importance to astrologers is the calculation of the Aspects. The relation of a planet, house or sign to other similar features within a natal chart; Aspects determine the weights and values used in the interpretation of any natal chart.

Traditionally, the proximity of one chart feature to another must be within a limited range of arc or, as it is more generally called, an orb. A conjunction configuration, for example, occurs when one planet is within plus or minus seven degrees of being in direct line with another, such as an eclipse.

Orb values

From an astrological point of view, the degree of influence attributed to the orbs varies a great deal according to the type of aspect. Professional Astrologer includes a complete set of Orb values as defaults. For particular applications concerning specific requirements, they may be altered to other values involving closer or wider tolerances and may also be assigned particular weighting according to the importance of the influences.

In addition, special Orb values may be assigned to the first, fourth, seventh and tenth Houses, Progression Aspects, Transit Aspects and Cross comparison Aspects.

User-modified files employing full AND/OR search logic may be included in the text files. Whenever the highlighted configurations occur in a natal chart, those files will be included in the interpretative analysis. A typical example, the AND/OR logic employed may include one or more planets occupying particular positions in a natal chart and may be configured to include the presence of any particular relationship.

Output from Professional Astrologer may be printed or saved as a text file for later import to Quill. At each stage, users have the option either of printing the contents of a screen or continuing to the next option selected at the input stage which includes text, graph and aspects pages for each of the Radix, Progression, Transit or Comparison options.

Print and hard-copy options are distinguished by the former being used for text printing and the latter for screen dumps. Screen dumps may be made in either of two formats; slightly faster, the proof-dump is graphically uncorrected in that the printed natal chart appears as a vertical ellipse; the second option corrects screen-to-printer discrepancies temporarily by stretching the screen, which prints the chart as a

circle. Although each stage offers the option of continuing to the next set of calculation representations or printing the contents of a screen an additional option, at the initial input stage, offers the option of Autoprint in text and either corrected or uncorrected screen dumps at the completion of each screen page.

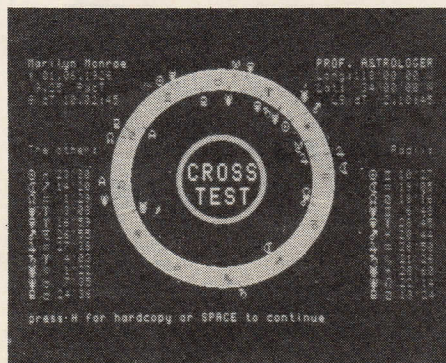
Almost eclipsed by the power of Astrologer, *Professional Astronomer* is no less packed with features aimed at precise observation of astronomical phenomena.

Astronomical calculation options available include Horizontal, Ecliptical and three configurations of Equatorial projection.

Astronomer offers the options of viewing the eclipse and phases of the inner planets – out to Mars – a Planetarium display of both hemispheres and zenith with a cursor to identify any of the planets present and, in common with Astrologer, a view of the solar system at the selected time and location.

A feature to the view of the solar system is the auto-run option, which will advance the movement of the planets at a daily rate from the time selected.

Overall, Professional Astrologer is extremely efficient in terms of the way



it utilises the QL memory as well as its file space requirements. It would have been relatively simple to aim it at expanded QLs, utilising disc-based storage – but it is available on either Microdrive cartridges – four of them – or on disc and is entirely compatible with 128K QLs. Interpretative text files for the Aspects, Houses and Signs, which may be altered or added to, take up some 190K of file space.

Two comprehensive natal data files, in compressed form, are included with the package. Before going into more detail regarding those files, it might be as well to describe the manner in which discs save files.

Each natal file occupies about 65 bytes. If each of those files were to be saved individually, they would occupy three sectors – 1,536 bytes – each on a disc. That happens because of the way discs work; anyone wishing to read the reasons for this particular quirk

should refer to Colin Opie's series in the January to March issues of *QL World*.

Astrological interpretation relies heavily on calculations accuracy of planetary positions. In this, Professional Astrologer must be rated very highly. The five most difficult planets for which to calculate positions are the Moon, Jupiter, Saturn, Uranus and Neptune.

Testing the Digital Precision claim for its accuracy, positions were taken from Raphael's Standard Ephemeris for January 1 from a random 47-year selection between 1831 and 1974. One of the problems encountered by using other ephemeris collections is that the majority of them have been produced in retrospect, while Raphael calculations are contemporary.

One of the peculiar problems associated with production of digital data is that people usually rely on the figures produced by various systems – time being one of them – as absolutes. To keep everything in perspective, if you were to make the smallest pin-hole possible in a roof which is 50ft. above a floor, lying on your back the area visible through the pin-hole would be approximately equal to one second of arc.

Comparison figures support the Digital Precision claim to one minute accuracy within this century for all of the planets with the exception of the Moon, whose position varies between maximums of +3'30" to -4'42" of arc.

With a typical 33 minutes of arc per hour movement, the Moon's physical displacement by this discrepancy amounts to something in the range of plus nine minutes to minus seven minutes of time. Very few people would be brave enough to place a birth time positively within that range of accuracy.

If all of the hard-copy options are accepted, as supplied Professional Astrologer will provide typically a complete 11-page report for any selected date; if all of the options for Transits, Progressions and Comparisons are printed, reports would well exceed that.

Catering for those interested in mainstream astrology, Professional Astrologer is a one-of-a-kind package. Descriptions such as superb, ultimate, excellent are barely adequate. Every requirement for both individual and specialised applications such as historical research, individual delineations, statistical research and many others is well provided for.

In common with Super Astrologer, Professional Astrologer is supercharged, which reduces loading and processing time. That this massive program is aimed at users of unexpanded QLs using entirely Microdrive-based systems in entirety to the credit of Digital Precision.

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In basic pressing F5 will bring back the last line typed; you can define keys for EDIT LIST etc.

QL CALC £9.95

This program makes use of the QL's multi tasking facility enabling you to press CTRL and any other key to give you a full calculator; having used the calculator you can return to the current program. This program can be used with Quill, Archive, Abacus and Easel. Features include mouse type operations, keyboard override, memory and all the standard type features very useful in a busy office.

QL SWITCH £14.95

This program will allow users with extra memory to run QUILL, ARCHIVE, ABACUS and EASEL at the same time, or two ARCHIVE programs and QUILL. Pressing a key will allow you to suspend the current program and switch to the new program.

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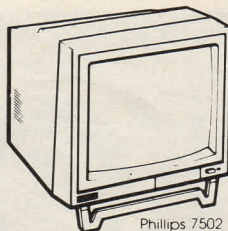
This program will copy all or selected files, delete one or selected files, display file to screen, change file name, format, and print multiple copies of Quill files.

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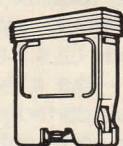
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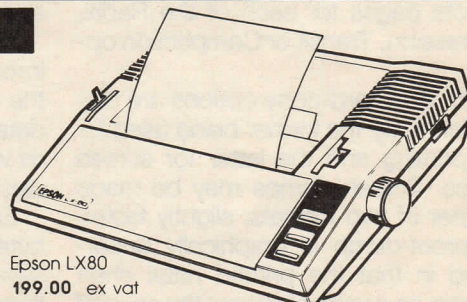
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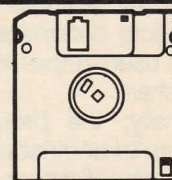
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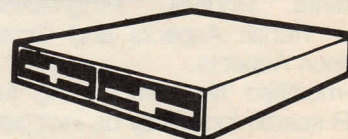
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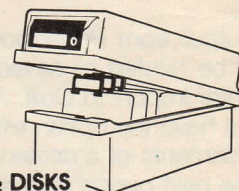


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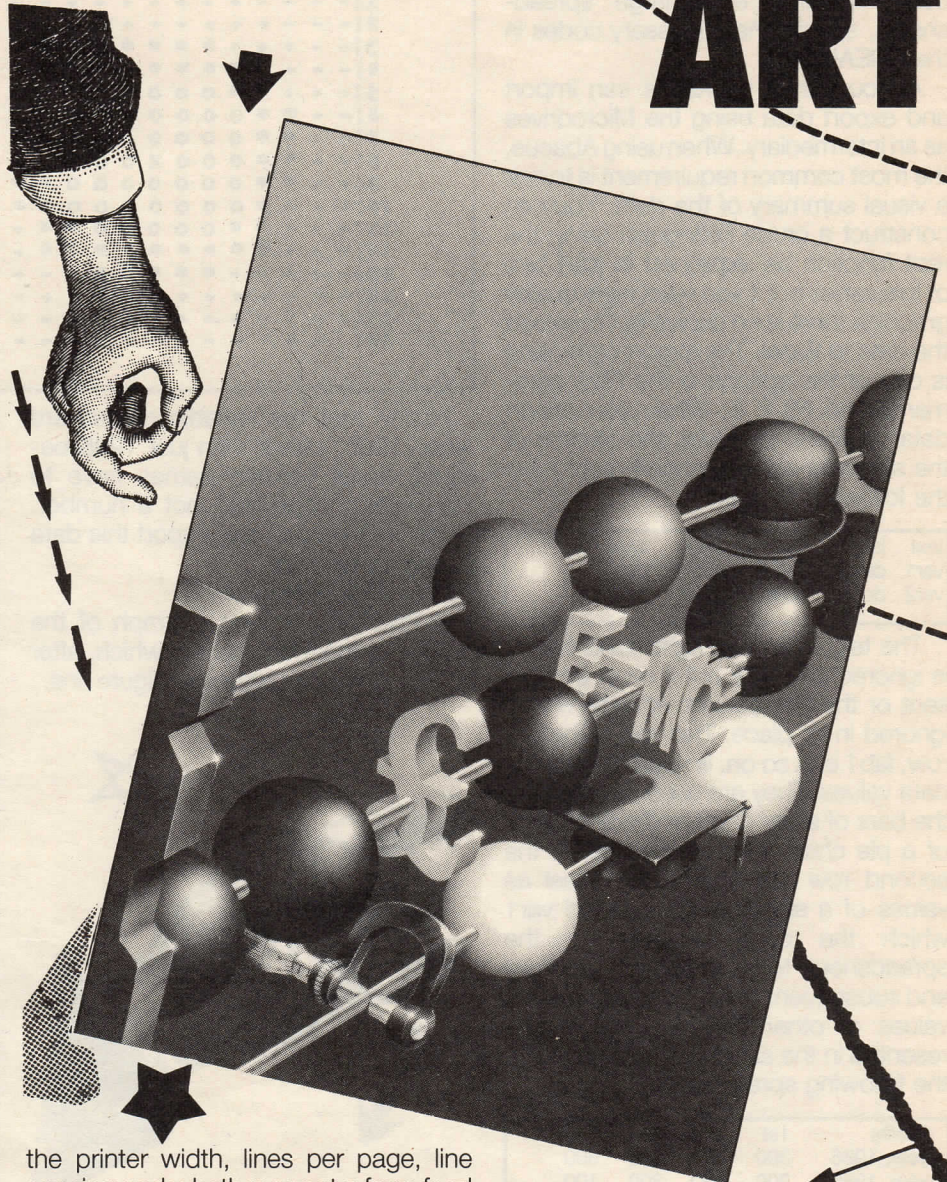
In this, the concluding part of our Abacus feature, Mike James looks at techniques of presenting information, paying particular attention to printing, booting and exporting.

In the three earlier parts of this series we have looked at the way spreadsheets are constructed but that is usually only part of a complete application. A spreadsheet has to supply information to be of use and that means either printing it out, drawing graphs from it or using it in combination with other software packages. In the final part of Abacus Art we look at techniques for presenting information and exporting it to other programs. As well as these topics, the BOOT program is examined with an eye to making alterations to the way Abacus is run.

In principle, printing a spreadsheet is easy. All you have to do is use the print command F3 P but in practice getting the layout you want can be a little more difficult. The first thing to check is that the printer you are using is installed correctly. That is done in exactly the same way for all the Psion applications packages. From SuperBasic, type `!run Mdv1_install_bas`; that runs a menu-driven program which will allow you to specify which printer model you are using. The result of the install processes is a data file called `install_dat` which, so long as it is present on the same Micro-drive cartridge, will be used by Abacus to determine what control codes to send to the printer.

Installing a printer driver is important but you will find that it does not help with many of the format and layout problems of printing a spreadsheet. If you change the specification of the line or page length in the printer driver, Abacus will still print your spreadsheet as if you were using a standard 80-column printer with 66 lines to a page. If you try to print-out a large spreadsheet, Abacus will cope by dividing it into segments which will fit on a standard A4 page.

That is very useful but some printers can handle 132 characters to a line, which makes it possible to print whole spreadsheets in one go. To change the way Abacus prints spreadsheets you have to use the Design F3 D command. That gives you the option of changing



the printer width, lines per page, line spacing and whether or not a form feed should be used between pages. If you change any of those settings, Abacus will lay-out your spreadsheet accordingly, irrespective of what the printer driver says. Some of the other Psion applications programs are not so disregarding of the printer driver.

Although there are no explicit commands for using sophisticated printer features, such as bold, italic or underlining, you can make use of them in a spreadsheet by using the `chr` function to send the appropriate control codes to your printer. If you are using an Epson FX-80 printer or a compatible model, putting `chr(0)+(27)+"E"` into a cell will switch on bold printing and `chr(0)+chr(27)+"F"` will switch it off.

You can use that device to make a main title – printed-out in bold; the only problem is that the cell to the left of the

title will show on the screen as "E" and the one to its left as "F". While on the subject of using the `chr()` function it is worth mentioning that you can see the whole of the QL character set by entering `col=chr(row()) FROM 1 TO 255`.

You cannot really use the `chr()` technique to send initialisation codes to the printer because even if you place the `chr()` expression in A1, the top border would be printed before the initialisation codes reached the printer. The solution is to use the PREAMBLE CODE in the printer driver, and possibly the POSTAMBLE CODE to re-set the printer after printing the spreadsheet.

The PREAMBLE CODE is a sequence of codes sent to the printer before anything is printed so if you wanted to set the printer into a condensed typeface before printing extra large spreadsheets, specify the necessary codes in the PREAMBLE.

All four Psion packages can import and export data using the Microdrives as an intermediary. When using Abacus, the most common requirement is to see a visual summary of the data. You can construct a crude histogram using the rept function as explained in part two of this series but if you want high-quality graphics there is no choice but to export the data to Easel. The export command is one of the options in the Files command-type F3 F E. When you export data to Easel, by rows, the section of the spreadsheet you export must have the following format:

text	lab1	lab2	lab3	lab4	..
var1	data1	data2	data3	data4	..
var2	data1	data2	data3	data4	..

The text in the top right-hand corner is ignored by Easel but it must be present or the first column of data will be ignored in its place. The text in the top row, lab1 and so on, is used to label the data values. They are used as labels for the bars of a bar chart or the segments of a pie chart. The data values in the second row are treated by Easel as values of a single variable called var1 which the data occupies in the spreadsheet, to be graphed. The third and subsequent rows are treated as the values of other variables to be represented in the same graph. If you have the following spreadsheet:

Profits	1st	2nd	3rd	4th
year_1985	300	200	500	300
year_1986	200	400	300	100

with the text Profits in cell c3 you could export it to Easel with the command:
>export to easel, range c3:g5, by rows, to profit.

Figure 1.

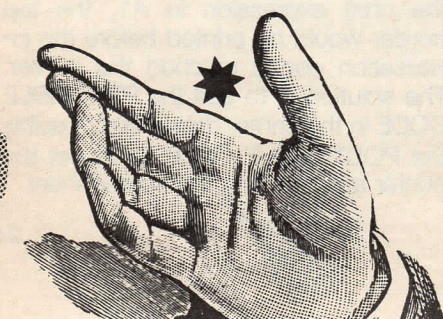
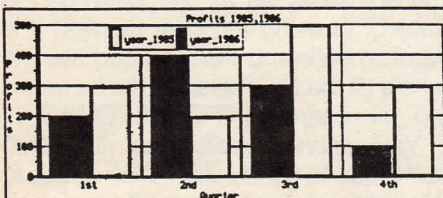
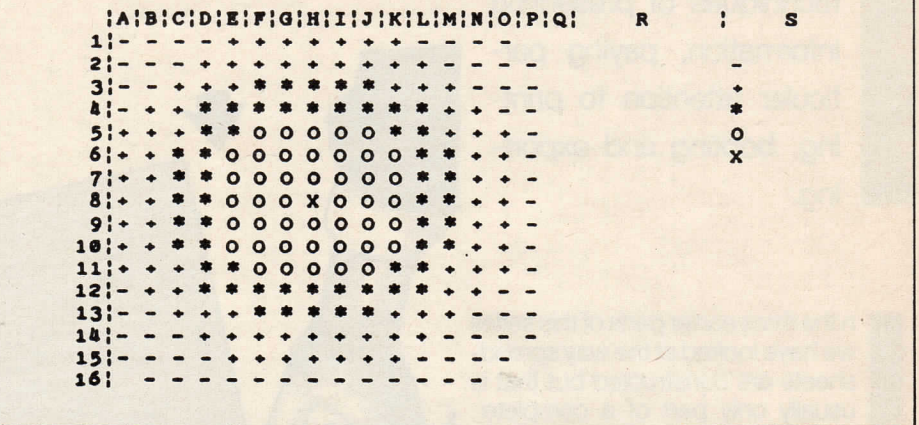
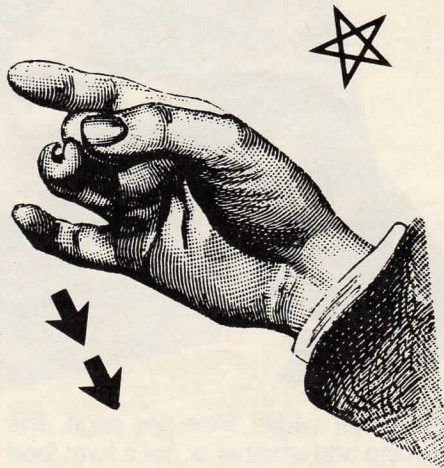


Figure 2.



Notice that the variable names are "year_1985" rather than just 1985 because Easel variable names have to start with a character, not a number. Once in Easel you can import this data by the command:
>Files: import from profit
and that will produce a graph of the profits for the four quarters which, after a little editing, can be seen in figure one.



The main difficulty about using Easel with Abacus is that usually you have to extract the figures from which you want to draw a graph from a larger spreadsheet. The easiest way is to make a copy of the desired rows or columns in an isolated part of the spreadsheet. That is a messy process but the only alternative is to design the spreadsheet so that the part which holds the data intended for graphical display is in the form given and that usually results in a rather odd-looking spreadsheet.

The amazing thing about using Abacus, or any good spreadsheet for that matter, is the way that you can achieve surprising results with only a little ingenuity. Would you believe it is possible to use Abacus to draw a two-dimensional plot of a function like: $\exp(-x^2 + y^2)$

It is possible and you can see the results of plotting this function in figure two. Once you have the basic principle, plotting any two-dimensional function is simple. The first problem is how to generate suitable values for x and y over an area of the grid. That is solved by using the functions row() and col() scaled suitably for the range over which you want the function worked out. If you enter the function:
 $\exp(-(\text{abs}((\text{row}()-8)/8))^2 + \text{abs}((\text{col}()-8)/8)^2)$
into cell A1 and then use the Echo command to replicate it over the range A1:P16 you will see a table of values for the function for x and y in the range -1 to +1.

The next problem is to change this table into a shaded plot of the function. That can be achieved by first converting its result to an integer in the range 1 to 6 and then using that to select one of six plotting characters. As the function being plotted varies between 0 and 1, changing the function in A1 to:
 $\text{int}(5 * \exp(-(\text{abs}((\text{row}()-8)/8))^2 + \text{abs}((\text{col}()-8)/8)^2) + 1)$
results in a table of numbers between 1 and 6. Selecting one of six characters on the basis of the result in each cell can be achieved by use of the index function. Remember that the index(col,row) function will return the contents of the cell in the specified column and row.

If you set up a table of plotting characters of the correct density, say Space, -, +, *, O, X, in column S - i.e., column 19 - then index (19,result of function) will return the appropriate plotting character. Thus the function in A1 becomes:
 $\text{index}(19, \text{int}(5 * \exp(-(\text{abs}((\text{row}()-8)/8))^2 + \text{abs}((\text{col}()-8)/8)^2) + 1))$
With that change all that remains is to reduce the width of the columns used to display the function to be a single character wide using the grid command. You can try plotting your own

functions using the same technique but be warned – if you see a very complicated function you might have to wait a long time for the results.

Sometimes you need to combine the information in a number of spreadsheets to produce a single summary spreadsheet. If you maintain a monthly summary of profit and loss it is useful to be able to combine a year's worth of such spreadsheets to produce a profit-and-loss statement for the entire year. You can combine a spreadsheet stored on Microdrive with one displayed on the

useful and easy-to-use operation.

The Abacus program is loaded into memory by a SuperBasic program called BOOT. The program prints a message that Abacus is about to be loaded, sets up an appropriate window and then loads Abacus. The BOOT program can be modified to carry-out any initialisation required before Abacus is run. The Abacus date() and time() functions will return the correct time only if it has been set, using SuperBasic, before Abacus is run and it is all too easy to forget to do that.

used as a fairly random number. Extracting seconds from the time() function is a matter of using string slicing, i.e., time() (7 to 8) will return the last two characters of the time string.

Converting the resulting two-character string to a number in the range 1 to 10 can be achieved using the val function, giving:
`int(val(time() (7 to 8))/6+1)`
 as the random number generating function which should be entered into cell D3. The text shown in figure four should be entered into cells A1, C1 and C6. The number of times table to be tested should be entered into cell B1. That can be changed at any time. All that is left is to set the problem and check the answer. Setting the problem is done by entering the following formulae into the cells indicated:

Figure 3.

```

10 WINDOW 512,256,0,0:CSIZE 1,1:CLS
20 AT 5,10:PRINT "Date and time=";DATE$
30 AT 6,15:PRINT "yyymmddhhmmss"
40 AT 7,15:INPUT d$
50 IF LEN(d$) <>14 THEN
  AT 10,2:PRINT "wrong format":GO TO 20
60 SDATE d$(1 TO 4),d$(5 TO 6),d$(7 TO 8),
  d$(9 TO 10),d$(11 TO 12),d$(13 TO 14)
70 AT 8,10:PRINT "Date and time=";DATE$
80 AT 9,8:INPUT "Is the date/time correct (y/n)";A$
90 IF A$(1)<>"y" THEN GO TO 10
100 CLEAR
110 WINDOW 512,256,0,0:CSIZE 2,1:CLS
120 AT 2,10:PRINT "LOADING QL ABACUS"
130 AT 4,13:PRINT "version 2.00"
140 AT 6,4:PRINT "copyright 1984 PSION SYSTEMS"
150 AT 8,13:PRINT "spreadsheet"
160 CLOSE #1:CLOSE #2:WINDOW #0,400,20,35,215
170 EXEC_W mdv1_abacus
180 OPEN #1,scr:OPEN #2,scr
  
```

Cell	Formula/value
B3	B1
C3	**
E3	=
F3	askn("what is "+str(B3,3,0) +"*" +str(D3,3,0))
F4	if(F3=B3*D3,"Correct","Incorrect")

Notice that the random number formula has already been entered into D3. The function which does all the work is the askn function in cell F3. It asks the multiplication problem each time the user types F3 X and enters the response into F3.

The use of askn is interesting because it goes beyond the manual definition of how it works by including functions and cell references as part of the question it asks. After the user has responded to the question, the formula in cell F4 compares the response with the correct answer and prints "Correct" or "Incorrect" as appropriate. The way in which the IF function works was explained in the second article in the series.

This simple spreadsheet is capable of being extended to include a count of how many correct answers there have been and to repeat the same question until it is answered correctly but these modifications are left to the reader as interesting exercises.

There are only three main micro-computer applications – word processing, database and spreadsheet. In the Psion applications packages we have a good foundation for all three and a good graphics package included. The only real difficulty in using Abacus is the amount of time it takes to import and export data using the Microdrives. With more memory the solution to the problem would be to use an integrated package similar to Lotus 1,2,3 but until someone writes such a program I will be very pleased to continue using Abacus.

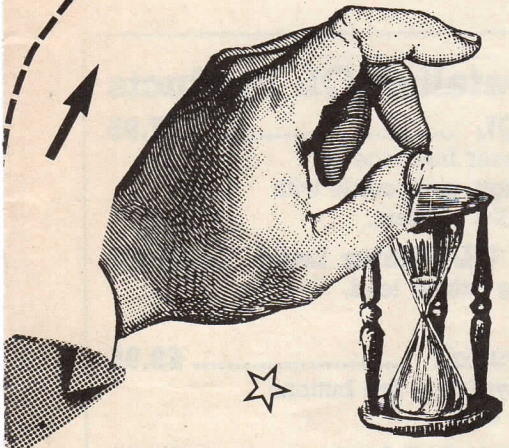
If you use the BOOT program given in figure three you will be asked for the date and time automatically each time you run Abacus. That is particularly useful when used in conjunction with a spreadsheet such as the freezer contents record given in part two. Another possible use of the BOOT program is to define any special characters needed within a spreadsheet.

As a final example of the range of which a spreadsheet is capable, the spreadsheet shown in figure four will set you a multiplication problem and tell you if the answer is correct. The same methods could be applied to a range of games and quizzes, so the details of how it works are worthy of attention.

Figure 4. A spreadsheet which tests tables.

	A	B	C	D	E	F	G	H
1	Test on the 15 times table							
2								
3	15* 4=	60						
4	Correct							
5								
6	type F3 X for another problem							
7								

The first problem in setting a question is how to generate a random number in a given range. Abacus has no random number generator but it has a clock and for many purposes the reading of seconds from the system clock can be



screen by using the merge, F3 M, command.

You can choose to add or subtract spreadsheet entries. Each cell in the spreadsheet stored on Microdrive is compared to the corresponding cell in the spreadsheet displayed on the screen and if they both contain numeric data or valid formulae their contents are added or subtracted. The resulting spreadsheet contains only numeric data in cells which have been affected as any formulae they contained are overwritten by the results of the merge. Obviously it is important to design or modify spreadsheets which are to be used in a merge operation so that they are laid out in exactly the same way but, apart from that restriction, merging is a very

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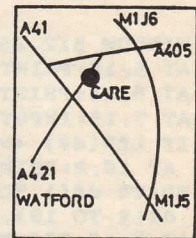
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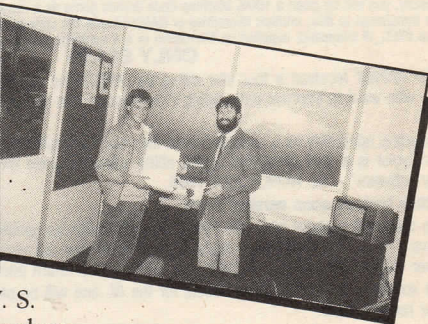
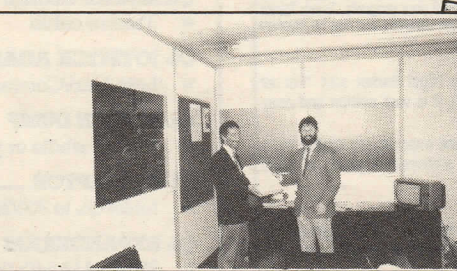
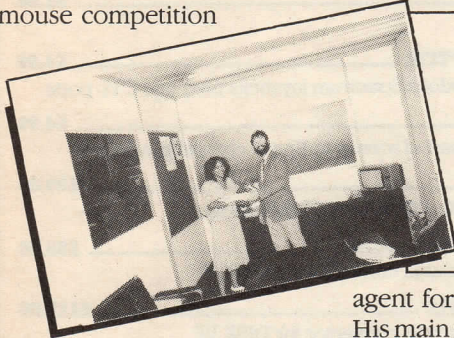
Three find mice

RESULTS

On Tuesday, July 22, the winners of our Eidersoft mouse competition

programming. Grenville, 36, is a sales

competition. The other three



converged on the *Sinclair QL World* offices to collect their prizes.

Our pictures show Gloria Graham, Mike Grenville and Graeme Archer receiving their mice from Ken Browning of Eidersoft.

Twenty-nine-year-old Mrs Graham is a team support worker at Lambeth Youth Aid Project. She uses her QL at work to maintain a local events database and at home to teach herself

agent for British Airways. His main areas of interest are comms, educational programming and graphics applications.

Sixteen-year-old Archer from Ardrossan in Scotland spent eight hours on the night train from Glasgow to make sure of collecting his prize. He is planning to study mathematics at Glasgow University and saw the review of the Eidersoft mouse in *Sinclair QL World* and was so impressed he decided to enter the

prizewinners are W. S. Sambrook of Birmingham, O. Carey of Darlington, and Fabien Roche from Pontcharra, in France, who will be receiving their mice through the post - RSPCA permitting.

Although the closing date for the competition has now passed, the surveys are still arriving and to date we have received nearly 2,000. Sifting through the entries it appears that most of our readers are men aged between 25 and 35 in

technical, scientific and administrative occupations. It is not surprising that many are computer programmers or work in computer-related occupations.

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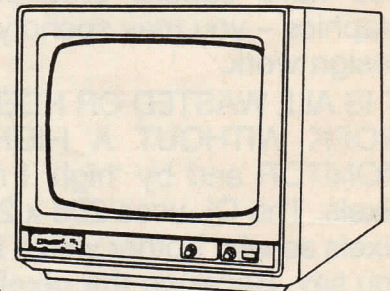
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CODE IN THE MACHINE

James Lucy concludes our Machine Code mini-series with a look at the available monitors.

The 68008 microprocessor used in the QL is a great attraction for the machine code writer; among its advantages are its many registers and a particularly rich instruction set. Those advantages nevertheless can expose all the more pitfalls for the unwary and it is easy to overlook the full action of one of the more complicated instructions or to lose track of the contents of a register. When that happens, or for other purposes like spying on the working of someone else's machine code program, it is time to reach for the monitor.

In this article, which follows from last

month's on machine code and assemblers, we look at what is required of a good monitor and compare the facilities provided by the various commercial offerings to this requirement. There is obviously no point in using a monitor unless you have at least a passing acquaintance with assembly language programming; working through last month's article will provide a basic grounding.

The first problem is to decide exactly what constitutes a monitor. Like most terms in the computing world the definition is not exactly set in concrete but, at the minimum, a monitor is a program which allows the user to scrutinise the operation of another program in as much detail as desired, if necessary instruction by instruction.

Since the user may not be the author of the monitored program and may not be in possession of the source code, it is useful if the monitor can convert the unintelligible numbers constituting the

machine code program into assembly language statements which can be understood by people – that is, it should operate as a disassembler.

If the monitor is to correct or modify a program, a one-line assembler or the ability to modify memory locations directly will be required and in that guise the monitor will be operating as a debugger. Ideally, then, the product you buy should be a monitor, disassembler and single-line assembler rolled into one. As can be seen from the table, some products fall short of that ideal. Two unusual and useful variations are complete machine code development packages, where an assembler and editor is included in the monitor, and the packaging of the monitor as a plug-in ROM.

Many facilities

The monitors tested have many facilities and are, in the main, sophisticated programs. For that reason it is not possible in this article to describe every product in detail but each program has a personality beyond the bald facts in the table which, not surprisingly, will have a considerable bearing on how well you accustom to it. Accordingly a thumb-nail sketch will be attempted for each monitor. First, though, we look at some general considerations when monitoring programs which should make some of the table headings clearer.

A general problem with monitors is their location in memory. If a monitor is 'EXECed' from Basic it will be loaded as a job and, while it may well multi-task with the SuperBasic interpreter, its presence will prevent resident procedure space being allocated, as may be required for a machine code SuperBasic extension.

Size is important

The Microdrive version of MonQL can be loaded into resident procedure or heap space. Qmon is not EXECed either, and the other monitors at least have facilities for reserving heap space from within them. Even more important than location is size; if you are trying to monitor a reasonably big program on an unexpanded machine it could be frus-

Mon QL is supplied as part of DevpacQL.



Supermonitor from Digital Precision. Inexpensive, but no comparison.

trating to find that the monitor will not fit. The table shows the size of the programs; it is interesting to note that Qmon includes a cut-down version without the assembler facilities which is about half the normal size.

An interesting difficulty arises when trying to monitor programs which use the screen a good deal; since the monitor will also be displaying its output on the screen there will be trouble. The Digital Precision monitor allows the window used to be re-defined before the start of a session, the display for MonQL and Assembler Workbench may be resized during monitoring, and Qmon supports transient windows.

That means that the area of screen which will be over-written by the monitor is saved to the heap, whence it is restored when the monitored program continues. In the meantime, the monitor can display the desired information.

The fundamental function of a monitor is to trace the operation of a program. That can be done by setting the trace bit in the 68008 status register, or by other means, but in any case a simple trace is inadequate on its own. You may wish to trace a few instructions, run the program at normal speed until a certain point, then run the program slowly until a particular condition is met.

When that happens, you might want to execute an arbitrary mix of monitor instructions. You will probably wish to disable the trace during calls to Qdos, in long loops within the program and

perhaps during calls to subroutines, but you would like to retain the option. The program which probably best satisfies those requirements is Qmon, although all the others except the DP monitor will do something similar.

A feature exceptional to Qmon, though, is the ability to back-trace, which is extremely useful if you over-shoot your intended stopping-place during tracing. The back-trace is somewhat illusory, as it seems to involve decrementing the program counter and restoring register values from a buffer; it is useful, nevertheless, and you did not expect reverse gear on a 68008, did you?

Memory searches

An important area, in which the programs differ considerably, is memory searches. The DP monitor distinguishes itself by having no search at all; Computer One and Assembler Workbench can search for strings and numbers but Qmon and MonQL can also search for instructions in whole or part, e.g., 'Moveq #0,'. Searches are useful for all kinds of things; you might want to change all occurrences of 'mdv' to 'flp', for example, or you may wish to look for the instructions which read the magic number from a cartridge.

Finally in our round-up of monitor features there is the question of line assemblers. Suppose that, in the course of debugging a program, you discover a slight error in an instruction. With most

monitors you can patch the machine code by poking-in the corrected value but that assumes you can work out the opcode. If not, you are compelled to return to your editor and assembler to correct the error.

A monitor with a line assembler solves the problem, because you can type-in the assembly language instruction and have it converted to machine code and placed in memory automatically. The only products with that very useful feature are Qmon and Assembler Workbench.

There are other features which are useful or essential, such as disassembly, in which there is not much to choose between the programs; copying sections of memory, a feature Qmon strangely lacks, help screens, pseudo-registers, job control and so on. Good documentation is vital with products of this kind, preferably with many worked examples; without proper documentation even an excellent product can appear poor and the purchaser will never appreciate the full power of what he owns. Where appropriate, all those points are discussed in the notes on each program.

Qmon - Qjump

This is an enhanced version of QL monitor, as supplied by Sinclair, both programs being written by Tony Tebby. The enhancements include some of the most pleasant features of the program, like back-tracing, macros and search for assembly language instructions.

	QMon (QJump)	MonQL (HiSoft)	Assembler Workbench (Talent)	Monitor (Computer One)	QL Super Monitor (Digital Precision)
PRICE	£20	£20 Cartridge £30 ROM	£25	£25	£19
SIZE (KBytes)	11 (Qmon 5)	14K (Cartridge)	20	18	9
DISASSEMBLY	Yes	Yes	Yes, includes ASCII Dump	Yes, with options	Yes
MEMORY CONTENTS DISPLAY	HEX and ASCII	HEX and ASCII	HEX and ASCII	HEX or ASCII options	Yes, 256 Bytes only
MEMORY EDITOR	Yes, simple	Yes, simple	Full editor, HEX or ASCII Entry	No, Modify Individual Locations	Yes, simple
MEMORY SEARCH	Numbers Strings Instructions	Numbers Strings Instructions	Numbers Strings	Numbers Strings Wild Cards	No
COMPARE MEMORY BLOCKS	No	No	No	Yes	No
MOVE MEMORY BLOCKS	No	Yes	Yes	Yes	No
TRACE (SINGLE STEP)	Yes	Yes	Yes	Yes, many options	Yes
Breakpoints in RAM/ROM	Both	RAM only	Both	Both (watchpoints in ROM)	RAM only
TRACE UNTIL CONDITION	Yes	No	No	Yes	No
SET & DISPLAY REGISTERS	Yes	Yes	Yes	Yes	Yes
PSEUDO-REGISTERS	No	No	No	Yes	No
MACROS/CLONES USER-DEFINED KEYS	Macros executed automatically		Definable function keys	Clone Individual Commands	
ALTERABLE SCREEN DISPLAY	No, but transient windows	Yes, limited	Yes, and Dual Screens for graphics	Yes	Yes, not within monitor
JOB CONTROL	Separate File	Yes	Yes	Yes	No
ON-LINE HELP	No	Good	Excellent	Brief	No

CODE IN THE MACHINE

The macro feature allows a number of monitor commands to be executed automatically after each trace step, at a breakpoint or as required. All commands are defaulted intelligently, which means that operation soon becomes natural and easy. The single-line assembler is an excellent feature.

A curious omission is the ability to move portions of memory, which can be useful if you want to make room for extra instructions in a program. The documentation is good, except that the examples are a little simple and do not demonstrate many of the facilities. Highly-recommended.

Computer One Monitor

One of the best features of the Computer One offering is the documentation. It needs to be good because, apart from the fact that there is no single-line assembler, it is a very comprehensive product. One of the most interesting features is the capability to clone monitor commands into daughter jobs which run independently. It is thus very easy to watch an area of memory, for instance.

The monitor has a rather academic and rigorous air about it and I found it needed a good deal of thought to operate. 'Junk at end of line' is a rather indecate way of describing one's errors.

The monitor is optimised for tracing jobs, rather than SuperBasic extensions; the latter requires some thought. It is not possible to search for instructions but the monitor is exceptional in its provision of pseudo-registers and a compare facility which will highlight the point at which two blocks of memory first differ. Recommended if you are prepared to put in the mental effort.

MonQL - Hisoft

MonQL is supplied on Microdrive as part of DevpacQL or on a ROM in its own right. The variants are functionally the same, except that the ROM uses very little memory and is available for use immediately. All the commands work neatly but once again there is a lack of a single-line assembler.

There is, however, an intelligent copy which can move a block of memory into an overlapping area and a very neat system of listing Qdos traps; whenever you request a list of trap routines the monitor senses the contents of register DO and places an asterisk against the appropriate routine in the list.

The monitor window can be re-sized at any time but the layout of the display is a little confusing and cannot be controlled to any great extent. I found the choice of command names to be rather 'un-nemonic' and difficult to remember, although that is personal. The documentation is reasonably good, with some helpful examples. The monitor is satisfactory, especially in ROM but I prefer some of the others.

QL Super Monitor - Digital Precision

Granted this is reasonably inexpensive but it does not stand comparison with the other products. For documentation you choose between a microscopic print-out or a Quill document on the cartridge. There is no search, no line assembler and weak trace and breakpoint facilities.

In favour of the program, there is a useful file-sizing utility and any-base number conversion, and a back-up cartridge is provided. Perhaps the worst

thing about the program is the description that it is state-of-the-art, top-flight, feature packed and amazing. It seems strange that it is from the same software house as Simon Goodwin's excellent SuperBasic compiler.

Assembler Workbench - Talent

There are only two shortcomings in this excellent program. The first is the documentation, which is on cartridge as an ASCII file, readable from within the monitor or by the supplied editor and lacking any tutorial, and the second is the relatively minor lack of a search for instruction facility.

Apart from that, the program is first-rate - sensibly-defaulted, helpful with errors and with all kinds of on-line help available. Dual screens for debugging graphics programs are possible; the function keys may be user-defined, commands may be taken from a file rather than the keyboard, and a small memory editor is provided.

The monitor gives Qmon a very close run for its money and includes a good assembler and excellent editor to boot. It is a pity Talent has seen fit to copy-protect, unlike any of the others, because that makes life more difficult for the genuine users and boosts sales of unlocking programs.

Conclusions

If you do not already have an assembler, the Assembler Workbench is the best choice. If you do, you might prefer the style of Qmon marginally. If you like your monitor in ROM, MonQL is an acceptable program. The Computer One offering is very sound and has that powerful cloning command but QL Super Monitor from Digital Precision leaves a great deal to be desired.



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Text files for Aspects Interpretation	30K	70K+
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By Charles Southey



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Rubber banded arcs	–	★
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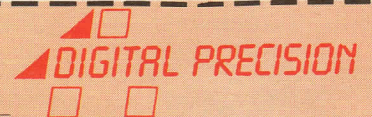
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UTILITY FILE

Ron Massey reports on this month's utility packages.

QL Diary Data Management £11.95

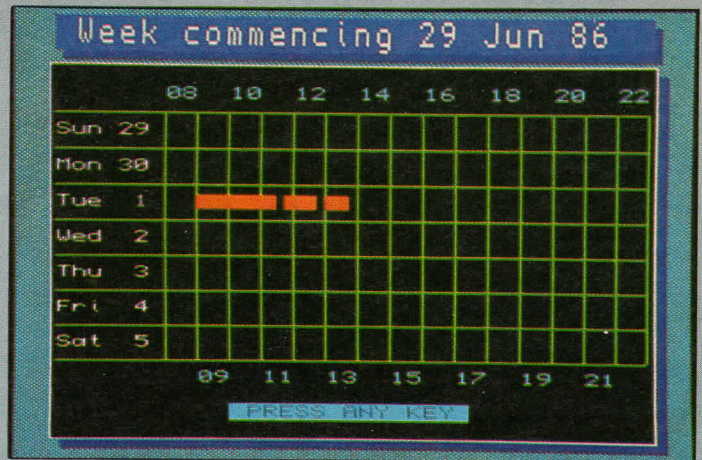
Keeping a diary has become a very important aspect of organising our lives and activities into something resembling logical progression and order. That popularity of the concept of the diary is almost universal can easily be seen by the diversity of diary types available for almost any particular application.

With the facilities offered by the QL, it was inevitable that electronic diaries would find their way into the repertoire of software

to have personal, business and social engagement records in separate files which are accessible through a common system.

Utilising the day-to-a-page and week-to-a-page format adopted traditionally by the majority of printed diaries, *QL Diary* requires that a file be available in a drive to which data can be written. Where none is available to the system, when it is used for the first time, an initialisation procedure is used to produce a file to which data can be written.

Each time *Diary* is loaded, you are offered the opportunity of setting the time and date for the QL operating system and the diary insert mode. The main menu offers the options of viewing a page of three calendars, in traditional



Life and Business Organiser.

scroll through.

Entering the week-per-page option, you can type up to two lines per entry. With that in mind, it is a good idea to limit weekly entries to basic information which can be obtained in detail from the daily pages. In common with the entire range of options, entries can be inserted, altered or deleted.

When using the day-to-a-page feature you can enter a change of date which will, in turn, call up the page for that date. Complete editing facilities for this option are available, as well as the option of hard-copy prints from any of the other information pages.

Short of switching-off or re-setting the QL, it is impossible to lose any changes made to entries. Whenever a page is completed or the QUIT option is selected, updating the data cartridge is automatic.

QL Diary has an alarm facility which can be used as an appointment reminder for any future date and time and is activated each time it is run. When the alarm is sounded, the message to which it relates is shown on-screen.

default categories for forthcoming, overdue, urgent and this week's engagements, with the option of adding a range of categories for individual requirements. Page selection produces particular screen information related to each of the defined categories. Other differences are evident in the way information is handled for each date and category. Four options are available for each entry made and are toggled on and off:

DURATION: When on, requests for the length of the appointment in terms of morning, afternoon or the whole day.

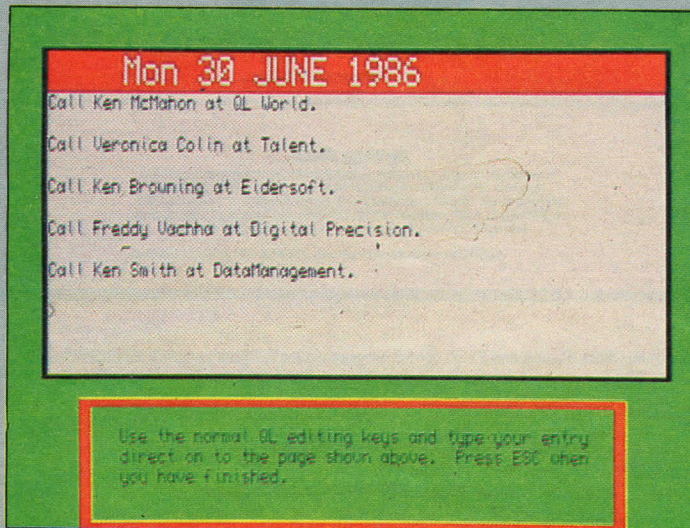
RANGE: Allows the automatic addition of a specified number of entries at regular intervals.

TIME: Allows a time to be placed against each addition.

EXPORT: Permits date to be exported for use with Quill or to a printer.

Of special interest to users of the system, automatic searches for information may be made by text or date. Two pages have been included which show either a week-planner or a month-planner in a bar graph display.

Overall, there is little to choose between either utility. They are both excellent programs in that they supply an efficient means of organising important engagements in the most efficient manner.



QL Diary - Engagements in order of importance.

available for home and business use.

The two similar utilities reviewed offer slightly different features and cater, in common with their book-like counterparts, for individual preferences. One advantage of using electronic diaries is that it is possible

format, and altering them for either previous or succeeding months. A sub-menu on that page includes prompts for altering the calendar display. You are also offered the option of entering particular dates into the display command which could otherwise take too long to

Life and Business Organiser Gemini Marketing £14.95

Taking a slightly different approach to information organisation, L.B.O. includes

Nucleon Pyramide £19.95

One of the most exciting utilities I have examined, the Pyramide *Nucleon* incorporates a suite of routines which enable you to produce windows, "music" – such as that of which the QL is capable – a generator for character, graphic and icon fonts and memory-conserving graphics and includes the option of generating SuperBasic programs at the end of each section for use in your programs.

Looking at the components of the system, the first routine is a program called *The Integrator*. Principally a file-

on-screen message "loading filename".

Once a boot program is generated – it will be saved automatically as a file to a designated drive – it can be edited in the usual way.

The *Nucleon Maestro* utility is a delight to use. If you are writing a program in which you want to make the best use of the ability of the QL to make coherent music, as opposed to the rude noises usually obtainable with the BEEP command, *Maestro* will enable you to represent the music graphically on a score sheet. Each note, the repeat of the same notes in a single entry, its position on the staff, and pitch is entirely menu-selectable.

Full editing, either for insertion or deletion, is

paper, ink, shadows and window identification.

The design process enables you to position each window with either screen cursor, pixel co-ordinates or character co-ordinates. Border sizes, shadow size and colour, as well as background colour are also user-definable. Once a screen layout is completed, you may save it as either a file or generate a SuperBasic program, for further additions.

The graphics component of *Compact Draw* is, as the name implies, a graphics program which produces space-saving drawings – from the point of view of file size. Like the other *Nucleon* utilities, drawings may be saved as files or as SuperBasic programs.

Additional *Nucleon* routines included in the system permit a screen file of 32K to be compressed by about one-third, depending on complexity; add LOCK or UNLOCK keywords to the QL vocabulary to enable/disable the break function; create a CLONE program automatically; or assign font sets or sprays to particular channels.

The manual states that *Nucleon* is designed to be user-friendly and, in that, I must agree; it is both clear and concise.

Translated from the French original, my only criticism of the manual is that it would benefit from expansion of portions of the instructions so that the full power of the program could be appreciated more fully.

Nucleon is unusual in a number of respects. It is one of the few programs available which will have a universal appeal to users at virtually any level of experience. It is also one of the few programs which makes programming power take on a new meaning. In summary, *Nucleon* is recommended wholeheartedly for beginners and seasoned programmers.

QL Peintre Pyramide £19.95

The world's first bi-lingual graphics program, the Pyramide entry into the ever-expanding field of QL graphics, *QL Peintre*, will give you a most impressive preview of its potential program power with its superb loading screen. According to Alex Gassman of Pyramide, it only took three hours to draw.

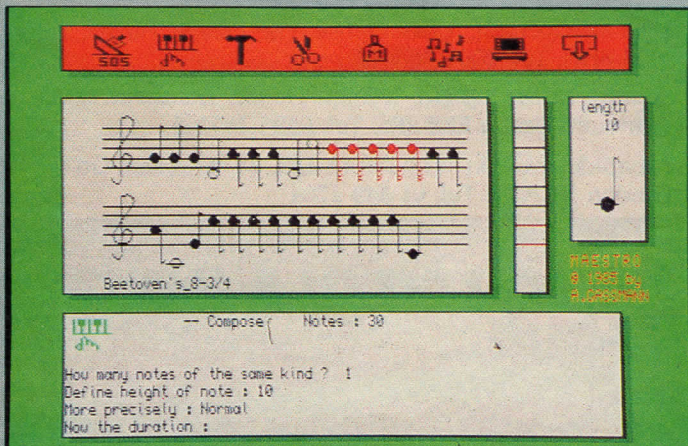
QL Peintre has implemented a number of very useful features in its operating system, with help prompts available at each of drawing and, during any complicated procedures, step-by-step instructions provided at the top of the screen.

Utilising single-key entry, access to the various commands is made with eight icons, nine labelled windows, solid re-colour palette patches, three ink-selection sampler windows and sensible prompts.

Rubber-banding has been implemented with all auto-geometry; lines may be bent into arcs; squares may be stretched or compressed into rectangles; circles may be made elliptical. Other options include a wide selection of pre-defined brush sizes and types, with re-definable footprints, and may be used in either paint or spray modes.

A doodle pad is available for testing combinations of colours, sprays or line and pattern combinations. A large range of pre-defined texture patterns is available which may be either modified or re-defined completely. Pan and scroll commands permit accurate re-positioning of your drawing. Another screen-handling option permits the complete screen to be rotated.

The magnification option opens a window on a quarter of the screen for positioning fine detail in a drawing. Work proceeding in



Nucleon. Recommended for beginners and seasoned programmers.

management front end, it may be used in a variety of ways.

In addition to the usual copy, delete – either total or selective – format or directory 72 files at a time commands, there is a facility for re-name and wild-card copy or delete. You are offered the option throughout of designating drive, either mdv, flp or hdk, as the default drive which may be used, in any combination, as defining the source and destination drives.

A command called boot_create will, through a series of questions, generate a Basic boot program. Consistent with superb attention to fine detail, it will initiate file-loading procedures with the

included in the system. Once a score is completed, you will have the option of generating a file or a SuperBasic program for later use.

Characters, the *Nucleon* font generator, includes a number of sample character sets. Full editing facilities enable customised characters to be produced and used in other programs as characters, icons or graphic symbols. The spray facility used in *Compact Draw*, as just one example, utilises the customised spray characters produced by this utility.

A utility for designing screens, *Windows* includes options enabling any number of windows to be positioned on-screen. Sub-options define borders,



QL Peintre. Increased sophistication.

the magnified portion of the image is echoed in the full-size drawing. An additional magnification mode feature will allow you to identify the magnified area of the full-size drawing.

Sub-options are available to each of the drawing modes, permitting re-colouring, enclosed shape filling and mixing - XOR over-painting of lines or shapes, as opposed to over-drawing. The COPY command duplicates selected areas of a drawing

in other parts of the screen.

Full screen text facilities are available in all of the usual sizes and in two font styles. Other typefaces can be produced by utilising the character generator/editor facility of the Pyramide Nucleon.

The printer dump is run separately from the body of the main program. When a drawing is completed, it is saved as a file; after re-setting the QL, the printer dump program is run and will ask for the picture file to be

UTILITY FILE

loaded into it. At that time you will have the option of selecting the area to be printed and positioning the drawing on the screen accurately.

It is not too surprising that each new QL graphics program, of which there are now some 14, exhibits increasing sophistication. QL Peintre is no exception. If the Pyramide products reviewed so far are a criterion, it seems that it is

to make providing 'that little extra' standard company policy. It is superb value but, considering its many advanced features, I feel that the program is somewhat under-priced.

QL Peintre is an excellent tool for producing illustrations in which fine detail is required; when used with the Pyramide Nucleon, it is a difficult combination to beat.

Information

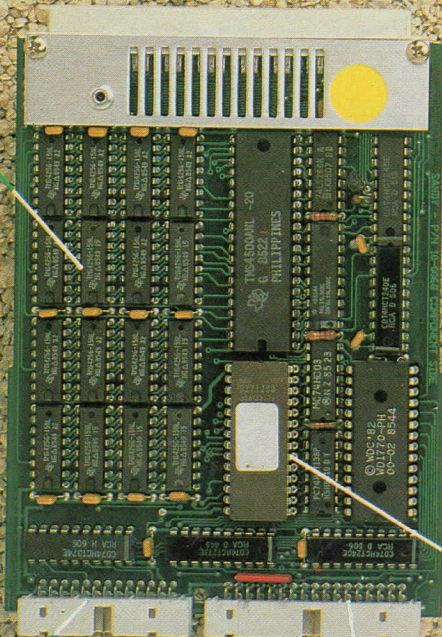
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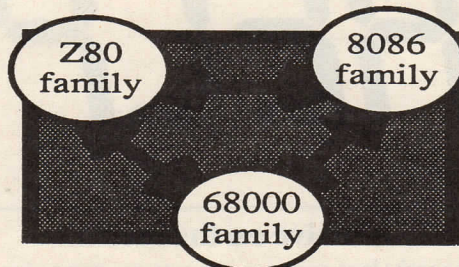
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Archive on the mend

It is perhaps a little unfortunate that the program used the keyword 'FOP_IN' as that is a toolkit extension to SuperBasic. If you have no toolkit of any kind you clearly will not be able to use the function.

There are a number of ways we can circumvent the problem and we shall explore a few of these avenues. The use of the keyword 'OPEN_IN' I suspect was inappropriate and therefore it appeared not to work. Before going on to obtain a solution to the query, let us first make sure we know that 'FOP_IN' and 'OPEN_IN' are and what exactly it is they do.

The SuperBasic extension 'FOP_IN' is a function which will return an integer value representing an error condition. As we all know, SuperBasic has no real error-trapping facilities and so if you try to open a file for input, and the file does not exist, your program will halt abruptly. It would be better if some mechanism existed which would enable us to look for a file and tell us, under program control, whether the file existed or not. That is what 'FOP_IN' does. In Charles Dillon's program, line 27 contains the statement:

```
LET wrong = FOP_IN  
(#5,ipfil$)
```

The string variable 'ipfil\$' contains the name of the file you want to read. If the file exists, 'FOP_IN' will perform an implicitly 'OPEN_

Having recently lost some Archive files, painstakingly we listed the program printed in the January/February edition of *QL User*. When we ran the program it came to a halt in two places - lines 27 and 372. Those two lines have the common keyword "FOP_IN".

Our version of the QL

IN#5,ipfil\$' procedure call and return the value zero - signifying no error - to the variable 'wrong'.

If the file does not exist, no attempt will be made to open channel five and a (negative) error number will be assigned to the variable 'wrong'. The effect then is to obtain a sensible check, under program control, for the existence of a particular file.

Replacing the function name 'FOP_IN' with the procedure name 'OPEN_IN' clearly will not work. Why? Because 'FOP_IN' is a function which will return a numeric result. As such it must exist within an expression. 'OPEN_IN' is a procedure which attempts to open a channel to allow a specified file to be read. It does not return a value, it cannot be used in an expression, and it must form the basis of a SuperBasic statement in its own right. It is important that we understand the difference between a function and a procedure call. For example: These are incorrect:
30 x = OPEN_IN#5,fyle\$
30 FOP_IN (#5,fyle\$)

seems to recognise "FOP_IN" as a keyword but does not know what to do with it. We have many toolkits and we have tried using "OPEN_in" but that does not seem to have the desired effect.

**A.B. James
Newport Pagnell.**

These are correct:
30 OPEN_IN#5,fyle\$
30 x = FOP_IN (#5,fyle\$)

When deciding whether or not a keyword is recognised, a further point must be noted. We know that SuperBasic always lists known keywords in upper-case letters. If you type-in a listed SuperBasic program exactly as it is, SuperBasic will not convert keywords, typed in upper-case, to lower-case if it does not recognise the keyword. As such you could be fooled into thinking that your machine recognises the keyword, when in fact it does not. The best way to type-in listed SuperBasic programs is always to use lower-case and let SuperBasic convert that which it knows about to upper-case.

So much for that. Now let us consider some solutions to the problem. The simplest solution, of course, is to replace the 'FOP_IN' function call with an 'OPEN_IN' procedure call and hope that the file exists. That would imply that we can do no checking and

therefore the two parts of Dillon's program would have to be converted as follows:

```
27 OPEN_IN#5, ipfil$  
28 EXIT i_f_loop  
and  
372 OPEN_IN#7,yn$:  
wrong=0 : file_ip=1
```

That is all very well but we have now returned to standard SuperBasic which will stop with a fatal error at every conceivable opportunity. Assuming we have no toolkit, we could implement our own 'FOP_IN' function. That still has limitations, however, because we cannot use it to check if a file which we wish to open for writing already exists. There are other checks we may like to perform as well, for example whether or not the disc or cartridge is write-protected.

The program in figure one will provide a SuperBasic extension which fulfils all our needs in this respect. Type-in the program and save it on a cartridge or disc. Whenever you run the program the function 'DEVSTAT' will be added to SuperBasic. Clearly you need to run the program only once each time the QL is switched on or re-set. The function expects a single string argument, as follows:
30 status=DEVSTAT(devfile\$)
The string variable 'devfile\$' will contain the file name for which you wish to check - e.g., mdv1_prog1, mdv2_demo, and so on. DEVSTAT will return a numeric result having the following range

Slave QL

The low cost of the QLs now on sale prompts me to consider buying one as a back-up for my present QL. Rather than having a spare QL sitting idly by, awaiting a catastrophic failure of my main machine, I wondered if it would be possible to set it up as a printer driver/filer?

I envisage an arrangement where I can send files to be printed or SAVED on a slave

QL, allowing uninterrupted use of the master QL. Most of my time is spent using Archive, Quill and Abacus, so I would like to be able to use such a facility from those packages.

Would the much-derived network cable be of any use in such an application?

Alan Jarvis
Beaconsfield, Bucks.

of values and interpretations:
0 (or +ve) : Name given is legal, and file does not yet exist.

-3 or -6 f Out of memory.
-7 : Cartridge or disc is not in drive, or the device name is unknown.

-8 : Name given is legal, and file does not exist.

-9 : Device is in use, and cannot be accessed yet.

-20 : Cartridge or disc is write-protected, i.e., in read-only mode.

This is of great benefit to us. Using this function

```
28 <delete this line>
and
372 file_ip=1: IF DEVSTAT
(ynd$)=-8: OPEN_IN#5,ynd$:
wrong=
0:ELSE:wrong=-7:END IF
```

Note that DEVSTAT cannot perform an implicit OPEN_IN like the FOP_IN toolkit extension because it does not know whether you are checking for an input file, an output file, or just a valid device name - e.g., and so on.

There is no doubt that the

Figure 1. Devstat loader.

```
100 REMark DEVSTAT Loader
110 REMark (c) C.Opie 1986
120 :
130 base=RESPR(120)
140 FOR m=0 TO 113
150 READ x:POKE base+m,x
160 END FOR m
170 CALL base
180 STOP
190 :
200 DATA 67,250,0,12,52,120,1,16,78,146
210 DATA 112,0,78,117,0,0,0,0,1
220 DATA 0,12,7,68,69,86,83,84,65,84
230 DATA 0,0,52,120,1,22,78,146,74,128
240 DATA 102,4,83,67,103,4,112,241,78,117
250 DATA 65,246,152,0,46,8,44,9,66,132
260 DATA 56,16,86,68,2,4,0,254,118,2
270 DATA 114,255,112,1,78,66,34,70,211,196
280 DATA 44,9,58,0,102,10,112,2,78,66
290 DATA 32,71,112,4,78,66,34,70,85,73
300 DATA 61,133,152,0,120,3,45,73,0,88
310 DATA 112,0,78,117
```

means that we can test for any file or device in any of our programs and keep control within the program. Returning again to Dillon's now continue error-checking by re-writing the program with:

```
27 IF DEVSTAT (ipfil$) =-8:
OPEN_IN#5,ipfil$:
EXIT i_f_loop
```

use of DEVSTAT is preferred to removing error-checking from a program. Perhaps readers will be encouraged to use this extension in their programs so that toolkit owners and non-owners alike can share programs which cater for error-checking on files and devices.

There is no reason why two or more QLs may not communicate via the network ports. Standard SuperBasic is a little limiting in the way it allows you to use those ports but proprietary extensions exist if you wish to improve this.

When we talk of a network we are referring to a group of QL machines coupled loosely using the network cables. Each QL on the network should have a distinct station number. When a QL is first switched-on, or re-set, it assumes itself automatically to be network station 1. The procedure 'NET n' is used to assign a different station number to a QL. The value of 'n' should be between 1 and 63.

If we had two QLs we could leave one alone and set the other to, say, station 2. To communicate between machines a network channel needs to be opened on each communicating QL. A transmitting QL requires an output channel and a receiving QL requires an input channel.

When the channel is opened it is possible to specify the exact station to which the data is to be written to or read from. For example, if we were using stations 1 and 2 we could use station 2 as a printer buffer QL by using the following code:

```
100 REMark NETWORK spooler
110 NET 2:base = RESPR(50000)
120 REPEAT spooler
130 i=base:OPEN#3,neti_1
140 REPEAT loop
150 b=CODE (INKEY#(3,-1)):POKE i,b:i=i+1
160 IF b=26:EXIT loop
170 END REPEAT loop
180 CLOSE#3:i=base:OPEN#3,ser1
190 REPEAT loop
200 b=PEEK(i):IF b=26:EXIT loop
210 PRINT#3,CHR$(b);:i=i+1
220 END REPEAT loop
230 CLOSE#3
240 END REPEAT spooler
```

The size of the spooler buffer is given by the RESPR statement. If the transmitting station is not station 1, it would be simple to change

the station reference in the NET_I statement in line 130.

If we wanted to spool a file from transmitting station 1, we could enter the code: copy MDV1_myfile to neto_2 open#3,neto_2:print#3,chr\$(26);:close#3

The first line sends the file. The second line sends the control code being used to tell the spooler we have finished. It is important that the spooler station is running the spooler program before we try to send anything to it. It is also important to close the neto_2 channel to force all the data to be sent. Data is normally sent across the network in 255-byte blocks. If we do not close the channel, the control code will not be sent.

We can improve on that system by making it more general. If a receiving station opens a NETLn channel, where 'n' is the receiving station's number - i.e., not the number of the transmitting station - the station will collect data satisfactorily from any transmitting station sending data to it but not to other receiving stations.

You can also go into broadcasting mode. In that mode the transmitting station can broadcast data to more than one receiving station. To do that, open a channel using station number 0 - the broadcasting station. You must not assign a QL to that station number; simply open a channel using NETO_0 or NETL_0 as appropriate.

That is the sum of the facilities afforded normally under SuperBasic. If you wish to have much-improved network handling I can recommend Tony Tebby's Toolkit II, available from QJump or Care Electronics. That ROM, among hundreds of other things, provides enhanced network facilities including buffer size specifications, proper file-server operations - e.g., open a window on another QL screen - network hiding, I/O device sharing and messaging.

PUZZLE PAGE

It was raining, so I did not really want to walk to the pub. I had fed the cat as many times as possible – and myself even more. The time definitely arrived to devise a puzzle page. I braced myself, then sat down resolutely to see what was on television.

Eventually, I had to admit that I would not be able to think of some unusual idea for this month's page. So, instead, I offer a very simple program to solve a very simple and well-known problem. It is shown in figure one. It is programmed very badly. Rather than using meaningful identifiers, I have used single letters. I found that rather confusing, too, and I have made a number of minor errors. Nothing serious, but the program does not work.

What I would like you to do is decide where the errors are and put the answers on the entry form. In all cases the error can be corrected by substituting one identifier for another. There are five mistakes in all.

If I was feeling generous I could tell you what the program is designed to do. Unfortunately I am not. One clue I will give is that PROCEDURE 'g' is the display procedure. You probably gathered that because of the PRINT statement. Anyway, I happen to know that procedure contains no errors.

When filling-in the entry form, answers such as: Line 100. From a To b will suffice. In this case, you would be indicating that line 100 should read: 100 b = 1

This month's solution should require no programming, other than

the one I have given you. Once you have worked out what the program is designed to do, I would be interested to see any other elegant solutions to the problem – the shorter the better.

RULES

All entries must be written on the panel provided on this page. Any other form of entry will be disqualified.

Entries must be sent by post to:
PUZZLE PAGE,
Sinclair QL World,
79-80 Petty France
London SW1H 9ED
to arrive no later than Monday September 15, 1986.

The winner will be the first correct entry drawn from the editor's hat. If nobody submits the correct alterations, the winner will be the person with the nearest answer.

All entries will be judged by the Editor of *Sinclair QL World*. The editor's decision is final and no correspondence will be entered into regarding the result.

ENTRY FORM

Errors are:

- | | | |
|---------|--------|----|
| 1. Line | . From | To |
| 2. Line | . From | To |
| 3. Line | . From | To |
| 4. Line | . From | To |
| 5. Line | . From | To |

Name: _____

Address: _____

Figure 1.

```

100 a = 1
110 b = 8
120 c = a
130 DIM d(b)
140 REPEAT e
150     IF c = a + c THEN EXIT e
160     f
170 END REPEAT e
180 g
190 :
200 DEFINE PROCEDURE f
210     d(c) = d(c) + a
220     g
230 END DEFINE f
240 :
250 DEFINE PROCEDURE g
260     FOR c = a TO b
270         PRINT "(:c:",";d(c):)"
280     END FOR c
290 END DEFINE g
300 :
310 DEFINE PROCEDURE h
320     IF d(c) = a + b THEN
330         i
340     ELSE
350         j
360     END IF
370 END DEFINE h
380 :
390 DEFINE PROCEDURE i
400     d(c) = b - a
410     c = c - a
420 END DEFINE i
430 :
440 DEFINE PROCEDURE j
450     k
460     IF l = a THEN c = b + a
470 END DEFINE j
480 :
490 DEFINE PROCEDURE k
500     l = 1
510     FOR m = 1 TO c - b
520         IF d(m) = d(c) THEN l = 0
530         IF c - m = d(c) - d(m) THEN l = 0
540         IF c - m = d(m) - d(c) THEN l = 0
550     END FOR m
560 END DEFINE k
    
```

SOLUTIONS

The Doodle Puzzle did not seem to confuse many people. The solution can be built as a tree-like structure, as shown in figure 2. This is simulated in the program – figure 3 – by an array (pos\$) and the pointers (pointer%) which build a tree structure, as shown in figure 4. When

solving the problem, the program produces all the possible moves from the 'present' position and each move is added to the tree, with a pointer to the next move generated.

By working through this linked list of positions, the program ensures that all positions are generated in order.

When generating those moves, the program must check to make sure that no position is duplicated. For instance, one of the moves

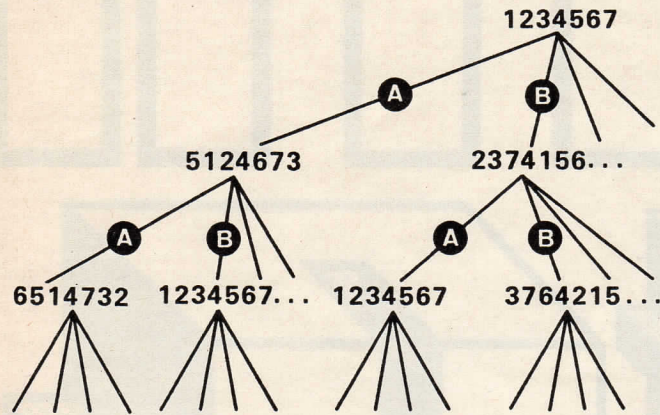
This month our resident problem poser Marcus Jeffery challenges you to correct the errors in a program listing.

SOLUTIONS

produced from the home position is "5124673" – using move 'A' complete clockwise. From that

algorithm. One fairly efficient hashing algorithm is to use the position as a seed for the

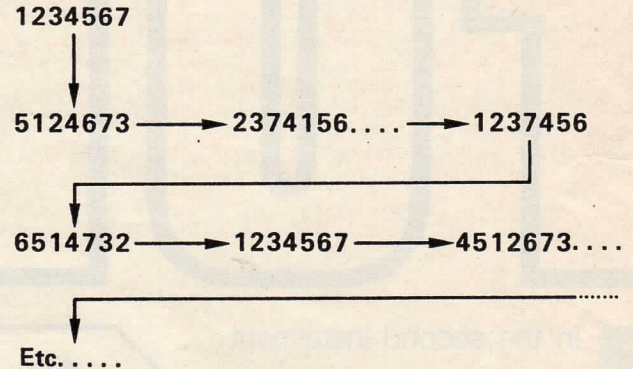
Figure 2.



position, move 'B' – complete anti-clockwise – will produce the result of "1234567". Obviously, that must not be added to the table, as it already exists. Therefore whenever a new

QL RANDOMISE statement. If you have sufficient memory for an array of, say, 18,000 to 20,000 elements, using the statements: RANDOMISE position table_entry = RND

Figure 4.



combinations of the other four digits in the number. First, one is subtracted from each of the first digits and base seven is used to give a result. For the highest first digits – i.e., "765" – this gives the maximum slot equal to: $(49 * (7-1)) + (6-1) + (1 * (5-1)) = 333$ slots

That is the value given to the size of the array 'space%' which keeps a note of the next empty location in each

the 'space%' array to 47. That gives smaller arrays – redundancy = 11.9% – but there are now 120 entries in each slot. Line 530 should be changed to: $530 \text{ slot} = 7 * (x\$(1)-1) + (x\$(2)-1) - 1$ and the value in line 730 should be altered to 5640. The number of moves required to reach the home position from "6245173" is five. The worst possible

Figure 3.

```

100 DIM pos$(7992,7),distance$(7992),pointer$(7992),space$(333)
110 true = -1 : false = 0 : count = 1
120 used("1234567") : space$(slot)=1 : pos$(j+1)="1234567"
130 present = j + 1 : last_used = j + 1
140 :
150 REPEAT build_tree
160   expand_tree
170   IF count = 5040 THEN EXIT build_tree
180   present = pointer$(present)
190 END REPEAT build_tree
200 find_level("6245173")
210 find_worst_case
220 :
230 REMARK -----
240 DEFINE PROCEDURE expand_tree
250   FOR mov = 1 TO 6
260     new_pos$ = map$(mov, pos$(present))
270     IF NOT used(new_pos$) THEN
280       space$(slot) = space$(slot) + 1
290       pos$(j+1) = new_pos$
300       pointer$(last_used) = j + 1
310       last_used = j + 1
320       distance$(last_used) = distance$(present) + 1
330       count = count + 1
340     END IF
350   END FOR mov
360 END DEFINE expand_tree
370 REMARK -----
380 DEFINE FUNCTION map$(x,x$)
390   SELECT ON x
400     = 1 : m$ = "5124673"
410     = 2 : m$ = "2374156"
420     = 3 : m$ = "4123567"
430     = 4 : m$ = "2341567"
440     = 5 : m$ = "1235674"
450     = 6 : m$ = "1237456"
460   END SELECT
470   y$ = ""
480   FOR i = 1 TO 7 : y$ = y$ & x$(m$(i))
490   RETURN y$
500 END DEFINE map$
510 REMARK -----
520 DEFINE FUNCTION used(x$)
530   slot = 49*(x$(1)-1) + 7*(x$(2)-1) + (x$(3)-1) - 1
540   i = 24 * slot : j = 1 + space$(slot) - 1
550   FOR k = 1 TO j
560     IF x$ = pos$(k) THEN RETURN true
570   END FOR k
580   RETURN false
590 END DEFINE used
600 REMARK -----
610 DEFINE PROCEDURE find_level(x$)
620   PRINT
630   IF used(x$) THEN
640     PRINT x$:" requires ":distance$(k):" moves
to reach home."
650   ELSE
660     PRINT "Error. Tree not fully expanded."
670   END IF
680 END DEFINE find_level
690 REMARK -----
700 DEFINE PROCEDURE find_worst_case
710   PRINT
720   largest_distance = 0 : position$ = "1234567"
730   FOR i = 2 TO 7992
740     IF distance$(i) > largest_distance THEN
750       largest_distance = distance$(i)
760       position$ = pos$(i)
770     END IF
780   END FOR i
790   PRINT "Worst case = ":position$
800   PRINT " requires ":largest_distance:" moves."
810 END DEFINE find_worst_case

```

position is generated, all the previously-generated positions must be checked to ensure that it does not appear twice.

One way would be to check all the previously-generated positions – there can be a maximum of seven (= 5040) of these, so this could be slow. Another method is to use a hashing

(1 TO 20000) you will have very few collisions. The smaller the table, the more collisions you can expect, and the longer the program will take to run.

The method used in the program in figure three is to utilise the first three digits as a 'slot' number. Each slot must have room for all

slot. Each slot must have room for four (= 24) entries. That gives a total array size of:

$333 * 24 = 7992$ entries and a redundancy of:

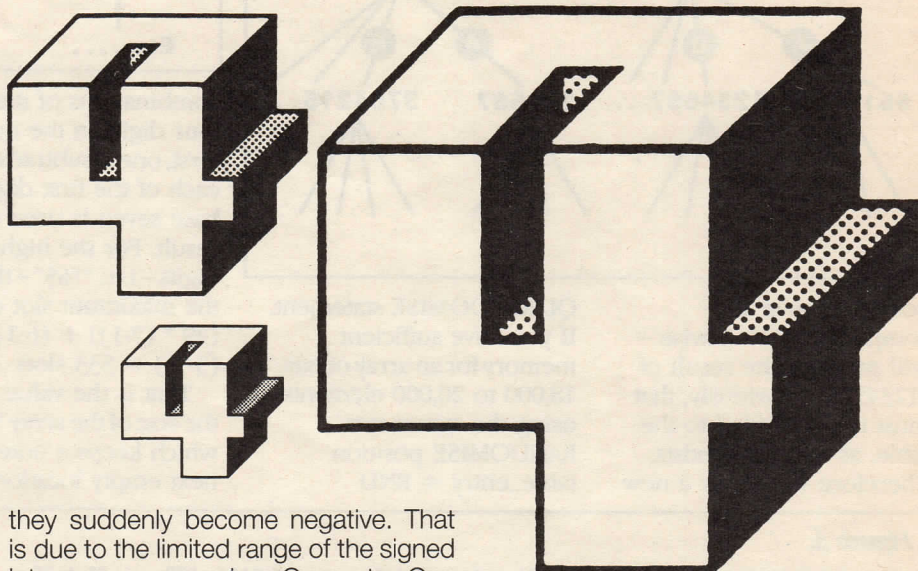
$100 * ((7992/5040)-1) = 58.6\%$ If you find you have insufficient memory for these arrays, change the main array values to 5640 and the number of slots in

starting position is "3214765" which requires 10 moves to reach the home position. There are no other positions which require so many.

One person who succeeded is D. Bloomer of Neasden, London who is the winner this month and will receive a year's free subscription.

FORTH

In the second instalment of our Forth feature, Charles Gerrard explains the theory behind looping.



Before moving to other constructs, after working in last month's article at how conditional statements are formed in the Forth language, it may be helpful to look at a more detailed example of the IF... THEN statement. Let us return to our original problem of printing-out any monetary sum.

You may remember that the major difficulty occurred when trying to print monetary remainders – i.e., pence – of less than 10. Instead of being shown as '.03', they were displayed as '.3'. Using the condition statement, we can now do this properly. The final version looks like:

```
: CPRINT 100/MOD." £" 1.R." ." DUP
9 > IF . ELSE ." 0" . ENDIF ;
```

Points to note are that it is written using Computer One Forth, so the THEN appears as an ENDIF. The '.R' which we used previously also prints-out the number, so there is no need to perform the operation afterwards, hence the missing dot. The new command 'DUP' duplicates the entry at the top of the stack. That is necessary so that the duplication can be used in the test "is the value greater than nine", creating a flag and destroying the duplicated entry. The flag is then removed from the stack by the IF command, leaving the pence value to be printed either with or without a leading zero.

If you try this, you will probably have a problem using large numbers where

they suddenly become negative. That is due to the limited range of the signed integers we are using. Computer One Forth, and many other implementations, allow access to double-precision numbers and so on.

For anyone wishing to try example programs while following this series, we will be using Computer One Forth throughout, though Forth is fairly standard and should easily transfer to any other system without modification. Remember that Computer One Forth uses ENDIF rather than THEN. There will be a few other minor differences between implementations but they are usually simple word substitutions or very minor changes in the syntax of the language.

We will now look at a number of loop structures available in Forth. One of the most common looping structures found in Basic is the FOR... NEXT loop, known as FOR... END FOR in SuperBasic. Forth has an equivalent statement but, as you might expect, it looks rather different:

```
finish start DO {body of loop} LOOP
```

The 'finish' and 'start' indices are placed on the stack. The DO removes them, places them on the return stack, and the body of the loop is executed.

The LOOP command then increments the index and returns the DO statement if the index is less than the finish index. Otherwise, execution continues after the LOOP statement.

A few conclusions can be drawn from the description. First, it should be noted that the loop always executes at least once, because the test is not carried-out until the LOOP statement is reached. Second, note that the loop will terminate when the two values are equal. Therefore if you wanted a loop to operate on all the values from '1' to '30' inclusive, the initial 'finish' index should be set to '31'.

In some versions of Forth, the DO requires the loop variable to follow it. So the structure in this case would be:

```
finish start DO index
{body of loop} LOOP
```

In Computer One Forth, the index of the first, or outer, loop applicable only when loops are nested – is assumed to be '1'. Therefore if you were to write the sequence:

```
: CLOOP 16 1 DO I . LOOP CR ;
and then type CLOOP, you would get the result:
```


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
ok

The body of the loop retrieves the loop index, I, and places it on to the stack. The dot then prints that and the loop continues until the index equals 16 – the finish index. The 'CR' after the LOOP command just executes a carriage return.

At present, the loop always increments by one but, as with the STEP command in SuperBasic, Computer One Forth has a special incrementing loop. This looks like:

```
finish start DO {body of loop} increment
+LOOP
```

So, if we were to change the above definition of CLOOP to be:

```
: CLOOP 16 1 DO I . 2+LOOP CR ;
we would get the result:
1 3 5 7 9 11 13 15
```

ok

You can, of course, use negative increments, as in SuperBasic. Even the loop:

```
: CLOOP 16 1 DO I . -2 +LOOP CR ;
eventually will terminate. That is due to the wraparound effect of the twos-complement numbers used. This loop will finish only when it has gone all the way through the negative numbers, wrapped around to the high positive numbers, then decremented to 21, 19 and 17.
```

In many basics, it is possible to terminate the loop ahead of time by jumping outside it. Most Forth implementations will also have forced termination of this form. The Computer One DO . . LOOP will terminate at the next test if previously it has encountered the word LEAVE.

There are a number of other loops which you are likely to meet. Though the exact syntax of them may change slightly from one implementation to the next, the following description of the loops available in Computer One Forth is fairly standard. All the other looping structures can be recognised because they start with the word BEGIN. First, there is the infinite loop. It follows the form:

```
BEGIN {body of loop} AGAIN
```

The only way this loop will terminate is via an error condition, or a termination such as ABORT or QUIT. For instance, this form of loop could be used to check for key input, say, of a 'Y' or 'N' for YES or NO. Combining the BEGIN . . ELSE with nested IF . . ENDIFs, the definition would be something like:

```
: YESNO BEGIN KEY DUP
89 = IF. "YES" ABORT
ELSE
78 = IF. "NO" ABORT ENDIF
ENDIF
AGAIN CR;
```

That construct would continue looping until either the 'Y' (code 89) or 'N' (code 78) keys were pressed. The only new word used here is KEY, which waits for a key to be pressed, then places its ASCII value on to the stack.

The DUP instruction, to duplicate the top value of the stack, is necessary for the second IF test. If the answer is not 'Y', the second IF loop is reached but by that time the initial value placed on the stack by KEY will already have been destroyed. The ABORT command will clear the stack, so no values – such as the duplicate – will be retained, even if the 'Y' key is pressed.

Probably a more useful-looping construct of this form is the BEGIN . . UNTIL loop, which takes the form:

```
BEGIN {body of loop} flag UNTIL
In this instance, the loop body is executed until the 'flag' returns true – i.e., a non-zero value – at which point execution continues after the UNTIL word. One example of this, given in the Forth manual, will wait until the ENTER key is pressed:
```

```
: TEST BEGIN KEY 10 = UNTIL ;
Adding two words, including EMIT, which will print the character of the ASCII value from the top of the stack, will give:
: TEST BEGIN KEY DUP EMIT 10 = UNTIL ;
```

In that case, all the characters will be displayed, including the ENTER (carriage return) which will terminate the loop.

The final loop structure is the most complex to use but can prove very useful in certain situations. It takes the form: BEGIN {main body} flag WHILE {conditional body} REPEAT

The main body of the loop is always executed. The flag is then tested and, if true, the conditional body of the loop is executed and control continues after the BEGIN, repeating the main body, and so on.

If the flag is false – i.e., zero – control passes to after the REPEAT word. For instance, if you were testing the user's response for the correct letter, say, in multiple-choice questions, this construct could be used. If we assume that 'A' is being tested for, then:

```
: TEST BEGIN. "lease hit a letter A, B,
C or D" CR KEY 65<>
WHILE. "No, that is the wrong answer"
CR
REPEAT. "Yes, that is correct" CR;
would suffice.
```

There is one final construct which we consider. It is the Forth equivalent of the SuperBasic SELEC command, which gives the computer a choice of options, based on a single parameter, and takes the form:

```
parameter CASE
value1 OF {body of 1} ENDOF
value2 OF {body of 2} ENDOF
value3 OF {body of 3} ENDOF
value3 OF {body of 3} ENDOF
valueN OF {body of N} ENDOF
{default clause}
ENDCASE
```

For instance, the YESNO construct could be re-written as

```
: YESNO BEGIN
KEY CASE
89 OF . "YES" ABORT ENDOF
78 OF . "NO" ABORT ENDOF
. "Please hit Y or N" CR
ENDCASE
AGAIN CR;
```

You will notice that it is not necessary to duplicate the key entry for the second test, as in the original example. Another variation on the theme would be to ensure that the 'Please hit Y or N' message was printed at the beginning. Rather than duplicate the message at the start of the construct, we could change it to:

```
: YESNO 0 BEGIN CASE
89 OF . "YES" ABORT ENDOF
78 OF . "NO" ABORT ENDOF
. "Please hit Y or N" CR
ENDCASE KEY
AGAIN CR;
```

The KEY is not checked for until after the ENDCASE, which will occur only if neither of the ASCII values for Y or N are at the top of the stack. The zero before BEGIN ensures that will be the case on the first execution of the loop. Therefore the message is printed.

Table 1, Computer One double number extensions.

Double number command	Single precision command	Meaning
2 DROP	DROP	Remove value from stack
2DUP	DUP	Duplicate value at top of stack
D*	*	Multiply values at top of stack
D+	+	Add values at top of stack
D-	-	Subtract values from top of stack
D.R	.R	Print value from stack
D<	>	These are all simple
D<>	<>	comparisons but working
D=	=	on double numbers
D>	>	
DO=	O=	
D>D	None	Converts a signed single number to a double

If you have been trying any of these examples, and in particular the monetary example, you will have noticed a problem with some numbers. They appear to go out of range very easily. The single-precision numbers we have been using have a range of -32768 to 32767.

If we are willing to sacrifice negative numbers we can alter the range to 0 to 65535. Most implementations allow that and there will be a range of additional



command words. For instance 'U.' is the unsigned equivalent of '.', and will print-out an unsigned number. So if you were to type-in the expression:

:ADD 11111 22222 + DUP .CR.UCR;
you would get the result:

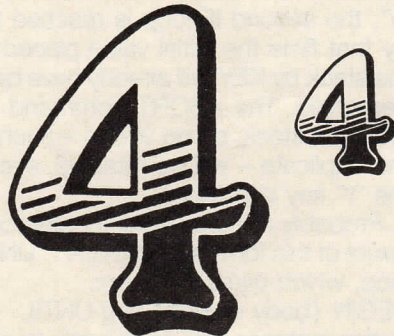
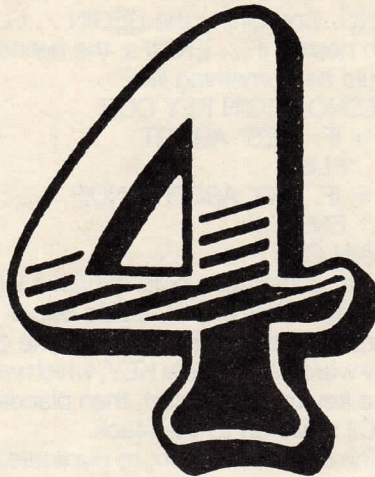
-32203
33333

ok

where the second number is the unsigned equivalent of the first. Other additional operations include 'U.R' for 'R' and 'UK' for '{'.

If that range is still not sufficient, double-precision numbers can be used. That increases the range still further, giving -2147483648 to 2147483647,

and each number requires four bytes on the stack. If we wanted to add two double-precision numbers, it is possible



that they may be fairly small – well within the single-precision range. Therefore just typing them, as we have been doing, will stack them as single precision. The way round this is to include a dot in the number. It does not matter where you place the dot. Both:

1.234 D.
and
12.34 D.

will give the answer 1234 but it seems sensible always to place the dot at the end of the number.

As with unsigned numbers, there is a range of special commands for double-precision numbers. Some of them, corresponding to other commands we have used are shown in table one.

Anyone using the Computer One version of Forth need not worry about the floating point commands.

Next month we will develop a complete worked example of a more complex program. To be consistent and to permit comparison with the previous Lisp series, this example will be the *Knight's Tour* of a chessboard. If you are feeling adventurous, you might like to try this before looking at next month's program. You are likely to be surprised at how much quicker Forth is than SuperBasic and especially Lisp.

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COMPETITION

QL ART COMPETITION



For the September competition, *Sinclair QL World* has more than £400 worth of software to give away. French software house Pyramide has provided 20 copies of its design utility *QL Peintre*. The program is one of the best design utilities available for the QL and normally would cost £19.95. To see what our reviewer Ron Massey had to say about it, turn to this month's Utility File on page 28. All you have to do to win a copy of *QL Peintre* is write a short program to produce a design on the QL screen. We will leave the choice of subject matter to you. Anything goes – from abstract images to digitised doodles. The only restrictions are that the program must be no longer than 50 lines and must be written in SuperBasic. When you have written your program, complete the tie-

breaker in no more than 30 words and send your entry on a microdrive cartridge to: Picture Competition, Sinclair QL World, 79-80 Petty France, London SW1H 9ED. Senders of the best 20 entries in the opinion of the editor will receive a copy of *QL Peintre*. Alternatively, prizewinners may select another program from the Pyramide range of *Nucleon*, *Othello*, *Vroom*, *Wanderer* and *Mortville Manor*. (Please indicate alternative choice on form.) The closing date for the competition is Monday September 22, 1986. If you want to produce some prize-winning pixels, you had better get cracking right away.

Entry form

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Complete the following sentence in no more than 20 words:

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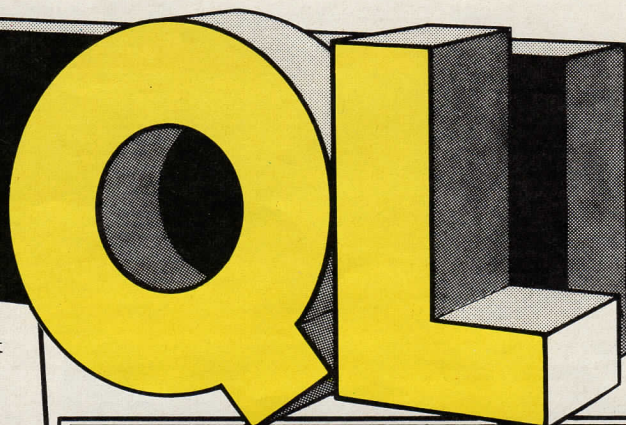
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SOFTWARE FILE

The Lost Pharaoh Talent Computer Systems £14.95

About six months ago there was a spate of ancient Egyptian games for the Commodore 64 and Spectrum. In them, the player took the role of an archaeologist/explorer, the aim being usually to discover the buried Pharaoh, treasure.

Talent has decided that if the theme is good enough for other machines it is good enough for the QL and has produced *The Lost Pharaoh*. It is essentially a maze game. You, in the guise of an intrepid explorer, must search the labyrinth of the Pharaoh's tomb for the sealed burial chamber. There you will find untold wealth in the form of all the Pharaoh's possessions, which he was hoping to take with him on his trip to the hereafter.

Any maze game would, of course, be a dreadful bore

were it simply a case of wandering round and round looking for the odd scarab. So to enliven things there are a few awkward distractions. No game would be complete without its share of monsters to chase you around. The Lost Pharaoh, in addition to the usual collection of nebulous blobs with faces, has snakes, scorpions, skeletons, and no doubt one or two others I was too busy running away from to notice. One alternative to running away is to shoot the monsters with your blunderbuss. The only problem is that the blunderbuss is not particularly reliable and at times fails to fire.

When you are not shooting monsters or running away, the idea is to collect keys from various parts of the maze. The keys open doors and provide

The Lost Pharaoh. Looking for the odd scarab.



access to other chambers, one of which contains the treasure. I managed to find what I think was the burial chamber but could enter only via a dead-end route, a highly frustrating.

A sandy-looking scroll at the bottom of the screen provides information on your progress. You start with five lives and each time a key is collected the tally is incremented. The disappointing thing is that when a key is used it is gone forever, so you would be wise not to run through doors willy nilly. Do not do

what I did and enter a cul-de-sac via a door with the last remaining key, only to have it close behind you.

As a maze game *The Lost Pharaoh* succeeds excellently. Tactically it has all the necessary requirements but what really makes it is the excellent graphics. Egyptian hieroglyphics look brilliant in pixels, a fact which probably accounts for the general popularity of this type of game on other machines. It deserves to do as well on the QL.



Zapper. Attack of the disposable nappies.

Eagle with Zapper Eidersoft £9.95

With two games for the price of one – less than £5 each – Eidersoft arguably could claim to offer the only budget software available

for the QL.

Eagle is a *Defender* clone. For those who shun the pleasures of coin-operated computing, *Defender* was, and is, an arcade game which will go down in history as one of the all-time greats, alongside such as *Galaxians*, *Space Invaders* and *Asteroids*.

The Eidersoft version is, by comparison with the original, fairly puny, but that is not surprising. What is a little disappointing is that it does not really stand up in its own right.

You control a ship which zooms across a single-line

landscape and must destroy the aliens which appear every now and then. After destroying the first bunch of aliens, more cannon fodder was difficult to find and looking for it soon became tedious.

Zapper, on the other hand, is a much better implementation of an old classic, *Galaxians*. The invading hordes hover menacingly at the top of the screen before starting their kamikaze-style attack runs.

You start the game with three ships and receive a bonus craft for every 10,000 points. When the first attack

wave is destroyed you get a crack at the second and so on.

The graphics are interesting, the aliens taking various forms from what looks like a disposable nappy to a Chinese lantern. After eight attack waves you return to the start.

My only two complaints are that the game does not seem to become any more difficult as you progress

through the levels and even more aggravating, was that, on occasions, the aliens appeared to be invincible – what we used to call not taking your shots.

As a package it is certainly worth the money – Zapper just about compensates for the deficiencies of Eagle but the old adage you get what you pay for undoubtedly applies. Do not expect anything brilliant.



Citadel. East meets west over a cuppa.

Citadel Eidersoft £9.95

The on-screen briefing informs you that the year is 2439. Other than the uncomfortable fact that this makes you about 460 years old the date is of little significance.

Citadel 5 is a divided city. The powers that be have decided that as they do not get on too well with the folks from across town they will split the place in two halves – East and West. As unlikely a scenario for a computer game as you could imagine.

The object of the game is to re-unite the two zones by collecting all the symbols scattered around the city. This is accomplished in your multi-directional variable thrust ship. The ship is docked in the Western half of the city. A quick blip on the joystick, or cursor keys, which is easier, sends it cruising out of the bay.

The objects which must

be collected to restore East-West harmony are teacups and glass vials. Picking them up is simply a question of manoeuvring alongside and touching them. The danger is that in your incompetence you are more likely to smack into a wall or get shot by the defence systems.

Your craft has an airbrake but it can be used only once per screen, so to stop you must turn the ship round and apply some reverse thrust. This is where the skill enters into it. After a time you will be able to change direction on the move by applying thrust at the correct angle to turn corners without stopping.

I must admit to finding the game somewhat pedestrian but not everyone likes the action at a furious pace. Citadel will probably appeal to those who enjoy a test of skill and accuracy.

Night Nurse Shadow Games £9.95

Night Nurse is not a sickly green medicine but a game where the nurse must be guided round the wards in a hospital to find the golden prescription which will allow her to retire early with an eligible young doctor. The game involves the collection of various items of use to any budding nurse, such as thermometers, bandages and tweezers.

Not all of the objects remaining in the wards are as useful as they might be, like the purple medicine marked X which, once taken, causes the nurse mysteriously to shed a few layers of clothing and quickly be reduced to her rather scanty underwear. Those rounds of the wards are naturally hindered by the presence of a range of bacterial-looking creatures

and a sex-starved doctor who dances through the wards. Encounters with the pests understandably reduce the nurse's stamina and therefore affect the overall score.

The level of humour in *Night Nurse* falls somewhere between Benny Hill and a Carry On script, with the under-dressed nurse straight from the pages of a Richard Gordon novel. If that kind of humour is appealing to you the game will provide good entertainment but it can wear a little thin after several plays.

Shadow Games is reported working on a new, improved version of the game. It may well be worth waiting for that, rather than parting with your cash now, only to feel sick when the new version is released.



Night Nurse. Eat your heart out Benny Hill.

INFORMATION

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Eagle, Zapper and Citadel
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SOFTWARE APPLICATIONS

This month John Barnes reports on the unusual use of QL is being put to in South London

puter to enhance the visual side of the system."

The QL therefore provides a news service, which is particularly popular during lunch-time sessions, an in-house advertising facility publicising forthcoming events at the Sussex, and a message service providing an added dimension to music dedications.

Text is keyed into the computer, with brackets displayed on the monitor acting as a scale indicating how many

two serial ports, the hardware available to expand the memory to half a megabyte if necessary, multi-tasking and a brilliant instruction set." The QL has proved, in the short period it has been used, a remarkably reliable machine, performing adequately everything which has been demanded of it.

Because of the reputation Microdrive cartridges had acquired Heartfield had resigned himself to the fact that they might have to invest in disc drives, but that has not been necessary, as only two Microdrive cassettes have gone down, both of which had back-ups and were re-formatted, so presenting no further problems.

As a professional programmer, Heartfield is also able to appreciate what can be achieved on the QL by any proficient person. "I am familiar with all kinds of Basics, working in a business environment, and SuperBasic is pleasant because it has some structure in it which allows for fairly well-structured programs, but there are certain little things which are not the same as standard Basic, so you can get caught."

Despite that, he has written some programs which have proved useful at the Sussex and has many programming projects he hopes to complete. One of them is a screen editor. It would not only provide the computer operator with a very useful aid but would also represent a considerable time-saving during busy periods.

The growing popularity of the message and news services are also making it a necessity, as the increasing amount of information which has to be fed into the computer allows less time for the important task of error-checking.

The editor, however, would help to rectify that. Once the system has been running for a period, any operation difficulties which may arise will be corrected and then Heartfield hopes to write several programs to utilise the computer even more. Such improvements definitely will enhance the already-impressive audio-visual system and make it much more versatile.

Pepin is convinced that is the way the computer ultimately will be used at the Sussex and is finding that it is invaluable for marketing, promotions and announcements or for communicating with customers.

The use of the QL is only in its infancy at the Sussex and both men intend to do a great deal more with it. "This is literally phase one." What we intend to do with this machine and the interest



The Sussex in Streatham, south-west London, is an ordinary enough public house from the outside but in the last 18 months has undergone a technological revolution, at the centre of which is a Sinclair QL.

Originally the pub was one of London's first venue houses regularly attracting a large number of locals to the live entertainment provided but through the years its popularity diminished. The pub has been refurbished and fitted with the latest audio-visual equipment. The new image the Sussex is presenting to the world has helped to re-establish its position as a top London pub and Whitbread's leading house in the U.K.

The audio-visual system installed recently incorporates satellite television facilities, broadcasting regularly selections of Music Box, the 24-hour satellite music channel, a 10-monitor Phillips hi-fi video network, compact disc and more than £15,000 worth of high-quality audio equipment.

The QL plays a very important part in the entertainments system, as Adrian Pepin, the licensee, explains:

"We did not want to show videos all the time but neither did we want blank screens, so we decided to use a com-

puter to enhance the visual side of the system. Messages, advertisements and up-to-date news are displayed and checked for errors, then scaled individually to save memory, on the smaller Hitachi 10in. monitors before they are transferred to the larger Phillips matchline monitors and broadcast round the bar.

The program has many additional features, all of which have been written-in to provide ease and speed of operation. A good example is an automatic check on colour combinations which prevents the operator concocting indefinable combinations of colour; there is also a colour update option which changes the screen colour automatically after an interval has elapsed.

The man behind the QL in every sense is Trevor Heartfield, a professional computer programmer with Citibank. He wrote all the programs used at the Sussex and was instrumental in the decision to buy a QL. Originally the function of the QL was to be performed by a Commodore 64 with a scratch-pad but the Sinclair was chosen because of the greater number of technical possibilities it could offer.

Heartfield explains: "The pleasant thing about the QL, even in its basic form, is that there are two Microdrives,

that has been shown in it is of real importance to the acceptance of computers for out-front business usage, as opposed to their traditional office role". The increasing popularity of the Sussex would seem to justify that optimistic view.

Has there been a noticeable increase in trade since the entertainments system was installed? "We have noticed a 25 percent increase in custom and the computer is a very important part of that, as the interest generated in messages and news items has shown. It is a facility which cannot be measured against anything else".

July's article on Data protection included an incorrect program listing, here with our apologies is the correct listing.

```
200 DEFine PROCedure password
210 count=0:pwd*=''
220 PRINT#0,'ENTER PASSWORD'
230 REPEat key
240 k*=inkey*(-1)
```

```
250 PRINT#0,'?';
260 IF CODE(k*)=10:EXIT key
270 pwd*+=pwd*+k*
280 END REPEat key
290 count=count+1
300 IF pwd*=password*:RETURN
310 IF count=3:CLS#0:STOP
320 CLS#0:GOTO 220
330 END DEFine
```

Peter Cowley investigates how it is possible to widen the choice of printed output from Quill.

So that you can employ in Quill the various foreign characters and also have a wider choice of print modes, such as pica, elite, italic, double width, in a single document, here are some hints on how to extend Quill to use the full range of characters of your printer.

The Quill printer driver is set for the U.S. character set and produces only one "foreign" character, the £ sign. How the Quill document appears in print depends on whether the printer DIP switches are set for pica, italic or whatever. In Quill, you are provided with choices between bold, underline, subscript and superscript but there is no facility for printing in other modes or for calling-up more foreign characters, unless you stop and make some tedious changes to the DIPs or the printer driver.

If you are working in SuperBasic, there is no difficulty. The standard printer code for selecting a different foreign language font is ESC, R, n where the value of n allows you to select the required font. In a SuperBasic program you put in a line equivalent to this, e.g.,
100 PRINT #4, CHR\$(27); CHR\$(82);CHR\$(2) will select German.

Other numbers in the final brackets will select other fonts. All the other facilities of the printer are accessible by similar insertion of the required codes. Quill, however, will not accept those codes - it simply reproduces them as part of your document. The following explains various ways of getting it to accept what control codes you want. Which method you choose is for you to decide.

The TRANSLATE option. The printer driver for Quill Version 2 provides for up to 10 translations of single characters. TRANSLATE 1 is already set to change

to the English set when £ is keyed-in and then back to the U.S. set. Inspection of the printer driver will show that this is achieved by TRANSLATE 1: £,ESC,R,ETX,#,ESC,R,NUL. If you are puzzled by the appearance of this, the various characters are explained in the User Guide under QL Programs Printers.

The point to understand is that this translation is making use of the printer code ECS,R,n. The beginning £,ESC,R,ETX (ETX=3) instructs the printer to use the English character set for the £; the rest causes the printer to revert to the U.S. set.

Similarly, you can have é in café by installing the Quill printer driver with TRANSLATE 3: é,ESC,R,SOL, {,ESC,R,NUL (type 131, ESC,"R,1,123,27,"R,0). That calls the French character set and then reverts to U.S. The problem is how to get é on to the QL screen? On my early AH QL, é is obtained as CHR\$(131) though the User Guide Character Set indicates CHR\$(143)! The keying for CHR\$(131) is CTRL Shift 3 - pressed all together. That produces é on the screen and é also appears in your printed document. If you need only a few odd characters, this is the best approach.

Replace existing Quill options. If you need to switch frequently between two language fonts, you may prefer to replace, say, the BOLD ON instruction in the printer driver by ESC,"R,2 (for German). You will then get the German characters in Quill when you access BOLD by keying F4 B. To allow exit from German to U.S., the BOLD OFF instruction should be amended to ESC,"R,0.

The various German characters will be listed in your printer handbook under the ESC,R,n code. The normal keying of [] { } ~ will produce the German Ä Ö Ü ä ö ü ß. One point to watch is that other TRANSLATES may interfere. If you key £ while using the German set it will have the effect of reverting to the U.S. set, so after £ it is necessary again to call BOLD ON. It is possible to call-up

alternative character sets covering several languages using the ESC,6 or the ESC,1,1 codes.

Your printer character set may not match that of the QL, so foreign characters may not appear the same on the screen as when they are printed. It is easier to cope with only a few such characters at a time by calling single language sets.

Other options, using printer codes directly within Quill, are possible because Epson-compatible printers have alternative keyings for many of the printer codes. They use chr\$(num), where num is 128 higher than the usual code, which lies in the range 0 to 127. Leon Heller drew attention to that in *QL World*, October, 1985, p.30. Thus Quill will not accept the ESC instruction CHR\$(27) but it will accept the QL keying corresponding to CHR\$(155). The keyings are listed under Character Set in the Concepts section of the User Guide. For chr\$(155) press the CTRL and ; keys at the same time.

In practice, most printer codes involve ESC so, to avoid complicated keyings, it is better to set up a keyboard character to be read as ESC, using the TRANSLATE option. Keying the copyright symbol will do that if the driver is changed to TRANSLATE 6: 127, 27. Install this and start a document in Quill. If you key-in the copyright symbol, followed without spaces by one or two control characters, the printer will behave as required. The control characters will appear on the screen but will not be printed. In that way many of the printer facilities can be accessed in Quill:

4 Italics on, 5 Italics off
M Elite on, P Elite off
p1 Proportional on, p0 Proportional off, and so on.

Finally, there is the possibility of using more than one printer driver, if they are stored under different names in the INSTALL_BAS program. For further details see the letters by Jim Knife and Peter Singer in *Open Channel, Sinclair QL World July*, 1986, p 15.

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SOFTWARE (VARIOUS)

RING FOR BEST PRICE

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SINCLAIR QL ONLY	£173.05	£199.00
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MICRODRIVE EXCHANGE

PROGRAM OF THE MONTH

This month's Program of the Month is **Cad QL** by Tony Quinn. It is a very sophisticated and much enhanced version of the program published in The Progs pages.

It includes many of the features you would expect to find in a good CAD package, including rubber banding, grids, circles, arcs, boxes, and a fill function. In addition there is a symbol designer which allows you to create up to 30 symbols for inclusion in your design.

CAD QL has been written in Superbasic and compiled using Digital Precision Supercharge, so screen designs, saving and loading can all be accomplished in Super-quick time.

Supercharge is available from Digital Precision
22 The Avenue, London E4 9SE Price: £59.95

HOW TO ORDER

Listed are programs which have appeared as listings inside *QL World/QL User* and *Sinclair QL World*.

To the right of each program entry is a small box, which you should mark with a bold cross if you want to order that program.

Once you have put a cross next to all the programs you wish to have copied onto microdrive, simply complete the rest of the order form and send it along with your PO/cheque AND BLANK FORMATTED DRIVE to:

MICRODRIVE EXCHANGE,
Sinclair QL World,
79-80 Petty France,
London SW1.

If you wish us to supply the drive, please add an extra £2.50 for every drive required and mark the order form appropriately.

Please allow 28 days for delivery.

ORDER FORM

Author	Language	Program Name	Price	Issue	Size
Giles Todd	(b)	DIY Assembler <i>Converts Assembler source into m/c object code</i>	£5.00	Mar/Jun	120 <input type="checkbox"/>
Tony Quinn	(SC)	CAD QL	£4.00	Set'86	120 <input type="checkbox"/>
A Didcock	(B)	Connect4 <i>Pit your wits against the QL</i>	£1.00	Sept	15 <input type="checkbox"/>
Shergold & Tose	(B)	*Golf <i>From fairway to green on 50 different courses of varying difficulty</i>	£2.00	May	35 <input type="checkbox"/>
Williams & Holliday	(AO)	Paladin <i>The basis of our games programming series - a space invaders type game written entirely machine code</i>	£5.00	Apr	70 <input type="checkbox"/>
Richard Cross	(MB)	Sprite Animation <i>A subtle blend of machine code and SuperBasic that produces a versatile sprite designer and high speed animator</i>	£2.00	Apr	50 <input type="checkbox"/>
Steve Deary	(B)	Pacman <i>A reasonably fast rendition of the famous arcade favourite</i>	£1.00	Mar	20 <input type="checkbox"/>
Andy Carmichael	(B)	Family Tree <i>Archive program and database for setting up and displaying large family trees</i>	£3.00	Aug	100 <input type="checkbox"/>
James Lucy	(B)	Composer <i>Composer and play sheet music on the QL</i>	£3.00	Oct	50 <input type="checkbox"/>
J M DOWER	(B)	Mushyman <i>Mushroom munching arcade action.</i>	£2.00	Jun/Jul '86	15 <input type="checkbox"/>
P J Smith	(B)	*DIY Adventure <i>A skeleton framework where you simply have to slot in the details to create your bespoke adventure</i>	£1.00	Feb	60 <input type="checkbox"/>
R Green	(B)	Qthello <i>A 3D version of the well known board game Othello for one or two players</i>	£1.00	Aug	25 <input type="checkbox"/>
S J Ackers	(B)	*Touch Type <i>Touch typing course - 14 lessons, on-screen keyboard, 800+ word vocabulary and WPM readout</i>	£4.00	Aug	80 <input type="checkbox"/>
Rob Sherratt	(AO)	FCOPY <i>A machine code microdrive utility for turbocharged file copying</i>	£4.00	Mar '86	80 <input type="checkbox"/>
Alan Prior	(B)	World Map <i>A high resolution multi-coloured map of the world for geography buffs</i>	£2.00	Mar '86	80 <input type="checkbox"/>

B = SuperBasic, SC = Supercharged AO = Assembler + Object Code (ready to run), MB = Machine Code + Basic loader

Name _____

Address _____

No of programs ordered	Total cost	£
Total sectors (max 200 per drive)		
No of drives sent		
No of drives required	@ £2.50 each	£
		Plus postage — packing	£ 0.75
		Sub total	£
		Add VAT @ 15%	£
		TOTAL TO BE SENT	£

Please copy on to Microdrive the programs above which I have indicated with a cross. I enclose a cheque/PO to the value of £(made payable to *QL World*). I understand that *Sinclair QL World* undertakes only to SUPPLY these programs (copied on to Microdrive) and accepts no liability for their operation as defined by the author. Neither can *Sinclair QL World* supply additional information about any of the listings other than that originally printed. Any article reprints required must be ordered and paid for separately at £1 each inclusive of post and packing (2 overseas). Please mark the envelope Dept. LB.

P + R : O = G < S

If you've a program that is worthy of consideration, send it to 'The Progs', Sinclair QL World, 79-80 Petty France, London SW1H 9ED. We pay for everything published at the usual page rates.

CAD QL Tony Quinn

Computer aided design seems to be the flavour of the month for the QL. There are no fewer than 13 commercially-available programs which enable you to produce on-screen designs with the help of your QL.

This program incorporates many of the features you will find on professional CAD packages. They include rubber banding, user-selectable grids, arcs, circles and boxes among others. Part completed designs can be saved to Microdrive and finished at a latter stage.

The version on Microdrive Exchange has a number of extra features. They have been

included on the main menu so that you know what you are missing but, if selected, will not function. In addition, the Microdrive Exchange version has a symbol designer which enables you to store much-used symbols and recall them for multiple use in your designs.

**PROGRAM
OF
THE MONTH**

```

100 DIM a$(1)
110 DIM s$(1)
120 DIM author$(50)
130 DIM mode$(5)
140 DIM col$(5)
150 DIM clear$(1)
160 DIM size$(1)
170 DIM symbol_number$(3)
180 DIM h$(10)
190 DIM v$(10)
200 DIM k$(5)
210 DIM pc$(10)
220 DIM xt$(10)
230 DIM text$(50)
240 DIM shape_data$(1)
260 col$="White":mode$="Move"
270 coordinate_display_flag=0:x_len=5:y_len=5:counter=1:qcomp_flag=0:ds=0:d=1:symbol_nr_buffer=0:sp=1:h1=0:v1=0
280 DIM sp(21):DIM sp_y(21):DIM sp_x(21):DIM sb(21):DIM h(20):DIM v(20)
310 SET_UP_NEW_WINDOWS
320 CHOOSE_A_GRID
330 INK #1,cursor_colour
340 cursor_flag=-1
350 REPEAT main
360 IF cursor_flag=0 THEN :OVER 0:LINE x,y
370 OVER -1:CORSOR x,y,-3,-2:PRINT ">";
380 KEYBOARD_INPUT
390 OVER -1:CORSOR x,y,-3,-2:PRINT ">";
400 IF cursor_flag=0 THEN :OVER 0:LINE x,y
410 IF coordinate_display_flag=1 THEN :display
420 IF cursor_flag=0 AND a=216 THEN :LINE x,y TO x,y-d
430 IF cursor_flag=0 AND a=208 THEN :LINE x,y TO x,y+d
440 IF cursor_flag=0 AND a=192 THEN :LINE x,y TO x-d,y
450 IF cursor_flag=0 AND a=200 THEN :LINE x,y TO x+d,y

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460 IF cursor_flag=0 AND a=97 THEN :LINE x,y TO x-d,y+d
470 IF cursor_flag=0 AND a=65 THEN :LINE x,y TO x-d,y+d
480 IF cursor_flag=0 AND a=122 THEN :LINE x,y TO x+d,y-d
490 IF cursor_flag=0 AND a=90 THEN :LINE x,y TO x+d,y-d
500 IF cursor_flag=0 AND a=39 THEN :LINE x,y TO x+d,y+d
510 IF cursor_flag=0 AND a=47 THEN :LINE x,y TO x-d,y-d
520 SElect ON a
530 =194:d=d-.5:CHANGE_CURSOR_SPEED
540 =202:d=d+.5:CHANGE_CURSOR_SPEED
550 =192:x=x-d:IF x<1 THEN BLEEP:LET x=g:NEXT main
560 =200:x=x+d:IF x>g THEN BLEEP:LET x=1:NEXT main
570 =208:y=y+d:IF y>ga THEN BLEEP:LET y=1:NEXT main
580 =216:y=y-d:IF y<1 THEN BLEEP:LET y=ga:NEXT main
590 =97,65:x=x-d:y=y+d:TEST_DIAGONAL_MOVEMENT
600 =122,90:x=x+d:y=y-d:TEST_DIAGONAL_MOVEMENT
610 =39:x=x+d:y=y+d:TEST_DIAGONAL_MOVEMENT
620 =47:x=x-d:y=y-d:TEST_DIAGONAL_MOVEMENT
630 =82,114:REMOVE_GRID
640 =248:OVER 0:SET_A_DOT
650 =244:OVER 0:SET_A_PAD
660 =105,73:CHANGE_COLOUR:INK #1,cursor_colour:NEXT main
670 =119,87:OVER 0:WRITE_TO_SCREEN_MENU
680 =88,120,89,121:IF coordinate_display_flag=0 THEN coordinate_display_flag=1:ELSE coordinate_display_flag=0:IF coordinate_display_flag=0 THEN :AT #5,0,7:PRINT #5,"":AT #5,1,7:PRINT #5,"":END IF :END IF
690 =32:CHANGE_CURSOR_MODE
700 =69,101:RUBOUT
710 =98,66:CHANGE_BORDER_COLOUR
720 =76,108:LOAD_DIAGRAM
730 =83,115:SAVE_DIAGRAM
740 =215:AUTHOR_OF_QCAD_QCOMP
750 =74,106:JOIN_DOTS
760 =67,99:CLEAR_SCREEN:IF a$=="y" THEN CHOOSE_A_GRID:END IF
770 =49:BLEEP
780 =50:ARCS_BOXES_CIRCLES
790 =53:d=5:INK #5,6:AT #5,4,11:PRINT #5,"":AT #5,4,10:PRINT #5,d
800 =232:RUBBER_BANDS
810 ON a = REMAINDER :NEXT main
820 END SElect
830 END REPEAT main
840 DEFine PROCEDURE CHOOSE_A_GRID
850 INK #6,2:AT #6,0,13:PRINT #6,"Dot : Square : No Grid - 'Q' for QL-COMP"
860 KEYBOARD_INPUT:CLS
870 SElect ON a
880 =83,115:SQUARE_GRID:QCAD_MENU:QCAD_LOGO
890 =68,100:DOT_GRID:QCAD_MENU:QCAD_LOGO
900 =REMAINDER :QCAD_MENU:QCAD_LOGO
910 END SElect
920 END DEFine
930 DEFine PROCEDURE CHANGE_CURSOR_SPEED
940 INK #5,6
950 IF d<.5 THEN d=20:END IF
960 IF d>20 THEN d=.5:END IF
970 AT #5,4,11:PRINT #5,""
980 AT #5,4,1:PRINT #5,"Step >":AT #5,4,10:PRINT

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#5,d
990 END DEFine
1000 DEFine PROCedure CHANGE_COLOUR
1010 IF cursor_colour=6 THEN cursor_colour=4:ELSE
cursor_colour=6:END IF
1020 INK #1,cursor_colour:STRIP #5,cursor_colour
1030 IF cursor_colour=6 THEN :col$="White ":INK #5
,0:AT #5,2,1:PRINT #5,col$:END IF
1040 IF cursor_colour=4 THEN :col$="Green ":INK #5
,0:AT #5,2,1:PRINT #5,col$:END IF
1050 PAPER #5,2
1060 END DEFine
1070 DEFine PROCedure display
1080 INK #5,0:STRIP #5,4
1090 AT #5,0,8:PRINT #5,"X >":AT #5,0,14:PRINT #5,
".0"
1100 AT #5,1,8:PRINT #5,"Y >":AT #5,1,14:PRINT #5,
".0"
1110 IF x<10 THEN AT #5,0,11:PRINT #5," ":AT #5,0
,13:PRINT #5,x
1120 IF x>9.5 AND x<100 THEN :AT #5,0,11:PRINT #5,
" ":AT #5,0,12:PRINT #5,x
1130 IF x>99.5 THEN AT #5,0,11:PRINT #5,x
1140 IF y<10 THEN AT #5,1,11:PRINT #5," ":AT #5,1
,13:PRINT #5,y
1150 IF y>9.5 AND y<100 THEN AT #5,1,11:PRINT #5,"
":AT #5,1,12:PRINT #5,y
1160 PAPER #5,2:INK #5,6
1170 END DEFine
1180 DEFine PROCedure QCAD_MENU
1190 CSIZE #4,0,0:CSIZE 0,0:PAPER #4,4:CLS#4:BORDE
R #4,1,255
1200 BORDER #6,1,255:CLS#6
1210 INK #4,0:AT #4,0,2:PRINT #4,"Commands : "
1220 OVER cursor_flag
1230 AT #4,1,2:PRINT #4,"Border "
1240 AT #4,2,2:PRINT #4,"Clear "
1250 AT #4,3,2:PRINT #4,"Erase "
1260 AT #4,4,2:PRINT #4,"Ink "
1270 AT #4,5,2:PRINT #4,"Join "
1280 AT #4,6,2:PRINT #4,"Load "
1290 AT #4,7,2:PRINT #4,"Merge "
1300 AT #4,8,2:PRINT #4,"New "
1310 AT #4,9,2:PRINT #4,"Old "
1320 AT #4,10,2:PRINT #4,"Print "
1330 AT #4,11,2:PRINT #4,"Remove "
1340 AT #4,12,2:PRINT #4,"Save "
1350 AT #4,13,2:PRINT #4,"Write "
1360 AT #4,14,2:PRINT #4,"X - Y "
1370 STRIP #4,2:INK #4,6
1380 AT #4,16,2:PRINT #4," F1 - Bands "
1390 AT #4,17,2:PRINT #4," F4 - Pad "
1400 AT #4,18,2:PRINT #4," F5 - Point "
1410 PAPER #4,4
1420 END DEFine
1430 DEFine PROCedure SET_A_PAD
1440 LINE x-1.5,y-1 TO x-1.5 TO y+1 TO x+1.5,y+1 T
O x+1.5,y-1 TO x-1.5,y-1
1450 OVER cursor_flag
1460 END DEFine SET_A_PAD
1470 DEFine PROCedure SET_A_DOT
1480 FILL 1:LINE x-1,y+1 TO x+1,y+1 TO x+1,y-1 TO
x-1,y-1 TO x-1,y+1:FILL 0
1490 OVER cursor_flag
1500 END DEFine
1510 DEFine PROCedure TEST_DIAGONAL_MOVEMENT
1520 IF y<1 THEN LET y=ga
1530 IF x>g THEN LET x=1
1540 IF x<1 THEN LET x=g
1550 IF y>ga THEN LET y=1
1560 END DEFine
1570 DEFine PROCedure WRITE_TO_SCREEN_MENU
1580 IF qcomp_flag=0 THEN :INK #4,2:STRIP #4,6:AT
#4,13,1:PRINT #4," Write ":PAPER #4,4:INK #
4,0:END IF
1590 CLS#6:INK #6,2:size=1
1600 AT #6,0,10:PRINT #6," [ 1 ] Normal : [ 2 ] Lon
g : [ 3 ] Wide Text"
1610 KEYBOARD_INPUT
1620 IF CODE (a$)<>27 AND CODE (a$)<>49 AND CODE (
a$)<>50 AND CODE (a$)<>51 THEN :GO TO 1610
1630 SElect ON a
1640 =49:CSIZE #1,0,0:size$="1"
1650 =50:CSIZE #1,0,1:size$="2"

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1660 =51:CSIZE #1,1,1:size$="3"
1670 =27:GO TO 1700
1680 END SElect
1690 WRITE_TO_SCREEN
1700 CLS#6
1710 IF qcomp_flag=0 THEN :AT #4,13,1:PRINT #4," W
rite ":CSIZE #1,0,0
1720 OVER cursor_flag
1730 END DEFine
1740 DEFine PROCedure QCAD_LOGO
1750 BORDER #5,1,255:PAPER #5,2:INK #5,0
1760 CLS #5:CSIZE #5,0,1
1770 AT #5,0,1:UNDER #5,1:PRINT #5,"CAD":CSIZE #5,
0,0:UNDER #5,0:INK #5,4
1780 INK #5,6
1790 AT #5,4,1:PRINT #5,"Step >":AT #5,4,10:PRIN
T #5,d
1800 AT #5,3,1:PRINT #5,"Symbol >":AT #5,3,10:PRIN
T #5,symbol_number
1810 INK #5,0:STRIP #5,cursor_colour
1820 AT #5,2,1:PRINT #5,col$
1830 PAPER #5,2
1840 INK #5,2:STRIP #5,6
1850 AT #5,2,8:PRINT #5,modes$
1860 PAPER #5,2
1870 END DEFine
1880 DEFine PROCedure CHANGE_CURSOR_MODE
1890 IF cursor_flag =-1 THEN cursor_flag =0:ELSE c
ursor_flag =-1
1900 INK #5,2
1910 IF cursor_flag=-1 THEN mode$="Move ":STRIP #5
,6:AT #5,2,8:PRINT #5,modes$
1920 IF cursor_flag=0 THEN mode$="Draw ":STRIP #5,
6:AT #5,2,8:PRINT #5,modes$
1930 PAPER #5,2
1940 OVER cursor_flag
1950 END DEFine CHANGE_CURSOR_MODE
1960 DEFine PROCedure KEYBOARD_INPUT
1970 a$=INKEY$(-1):a=CODE (a$)
1980 END DEFine
1990 DEFine PROCedure SQUARE_GRID
2000 INK #1,2:OVER 0
2010 FOR i = 2.5 TO rx STEP 2.5
2020 LINE i,2.5 TO i,ry
2030 NEXT i:END FOR i
2040 FOR i=2.5 TO ry STEP 2.5
2050 LINE 2.5,i TO rx,i
2060 NEXT i:END FOR i
2070 INK #1,6:OVER cursor_flag
2080 END DEFine
2090 DEFine PROCedure BLEEP
2100 BEEP 10000,1000,10,10,10
2110 END DEFine
2120 DEFine PROCedure CLEAR_SCREEN
2130 INK #4,2:STRIP #4,6:AT #4,2,1:PRINT #4," Clea
r ":INK #4,0:PAPER #4,4
2140 AT #6,0,18:PRINT #6," Enter ( Y ) to Clear Sc
reen"
2150 KEYBOARD_INPUT:IF a$="y" THEN
2160 CLS
2170 END IF
2180 CLS#6:AT #4,2,1:PRINT #4," Clear "
2190 END DEFine
2200 DEFine PROCedure RUBOUT
2210 INK #4,2:STRIP #4,6:AT #4,3,1:PRINT #4," Eras
e ":PAPER #4,4:INK #4,0
2220 INK #6,2:PRINT #6," Move Rubber <>? = 'E'
- Erase : 'C' - Cursor Size : [ ESC ] "
2230 REPeat rubber
2240 IF coordinate_display_flag=1 THEN :display
2250 OVER -1
2260 LINE x,y TO x+x_len,y TO x+x_len,y-y_len TO x
,y-y_len TO x,y
2270 KEYBOARD_INPUT
2280 LINE x,y TO x+x_len,y TO x+x_len,y-y_len TO x
,y-y_len TO x,y
2290 SElect INPUT
2300 IF a$="E" THEN :OVER 0:FILL 1:INK 0:LINE x,y
TO x+x_len,y TO x+x_len,y-y_len TO x,y-y_len TO x
,y:FILL 0:INK cursor_colour
2310 SElect ON a
2320 =27:EXIT rubber
2330 =67,99:CHANGE_RUBOUT_CURSOR_SIZE:LINE x,y TO

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PROGS

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x+x_len,y TO x+x_len,y-y_len TO x,y-y_len TO x,y:C
LS#6:PRINT #6," Move Rubber <>?= 'E' - Erase
:'C' - Cursor Size: [ ESC ] "
2340 END SELECT
2350 END REPEAT rubber
2360 cursor_flag=-1:CLS#6:AT #4,3,1:PRINT #4," Era
se
2370 END DEFINE
2380 DEFINE PROCEDURE CHANGE RUBOUT CURSOR_SIZE
2390 CLS#6:AT #6,0,9:PRINT #6,"Use Cursor Keys to
adjust Size. [ ESC ] to Return"
2400 REPEAT cursor_loop
2410 OVER -1:LINE x,y TO x+x_len,y TO x+x_len,y-y
len TO x,y-y_len TO x,y
2420 KEYBOARD_INPUT
2430 LINE x,y TO x+x_len,y TO x+x_len,y-y_len TO x
,y-y_len TO x,y
2440 SELECT ON a
2450 =27:LINE x,y TO x+x_len,y TO x+x_len,y-y_len
TO x,y-y_len TO x,y:EXIT cursor_loop
2460 =200:x_len=x_len+1:IF x_len>=40 THEN x_len=40
2470 =192:x_len=x_len-1:IF x_len<=2 THEN x_len=2
2480 =208:y_len=y_len-1:IF y_len<=2 THEN y_len=2
2490 =216:y_len=y_len+1:IF y_len>=40 THEN y_len=40
2500 END SELECT
2510 NEXT cursor_loop
2520 END REPEAT cursor_loop
2530 END DEFINE
2540 DEFINE PROCEDURE SELECT_INPUT
2550 SELECT ON a
2560 =88,120,89,121:IF coordinate_display_flag=0 T
HEN coordinate_display_flag=1:ELSE coordinate_disp
lay_flag=0:IF coordinate_display_flag=0 THEN :AT #
5,0,7:PRINT #5," " :AT #5,1,7:PRINT #5,"
":END IF :END IF
2570 =194:d=d-.5:CHANGE_CURSOR_SPEED
2580 =53:d=5:INK #5,6:AT #5,4,11:PRINT #5," " :AT
#5,4,10:PRINT #5,d
2590 =202:d=d+.5:CHANGE_CURSOR_SPEED
2600 =192:x=x-d:IF x<2 THEN BLEEP:x=2
2610 =97,65 :x=x-d:y=y+d:TEST_DIAGONAL_MOVEMENT
2620 =200:x=x+d:IF x>g THEN BLEEP:x=g
2630 =122,90:x=x+d:y=y-d:TEST_DIAGONAL_MOVEMENT
2640 =208:y=y+d:IF y>ga THEN BLEEP:y=ga
2650 =39: x=x+d:y=y+d:TEST_DIAGONAL_MOVEMENT
2660 =216:y=y-d:IF y<3 THEN BLEEP:y=3
2670 =73,105:CHANGE_COLOUR
2680 =47:x=x-d:y=y-d:TEST_DIAGONAL_MOVEMENT
2690 END SELECT
2700 END DEFINE
2710 DEFINE PROCEDURE CHANGE_BORDER_COLOUR
2720 INK #4,2:STRIP #4,6:AT #4,1,1:PRINT #4," Bord
er " :PAPER #4,4:INK #4,0
2730 AT #6,0,15:PRINT #6," Press < = [ ESC ] Sets
Border Colour"
2740 REPEAT bors
2750 KEYBOARD_INPUT:IF a<>27 AND a<>192 AND a<>200
THEN GO TO 2750:END IF
2760 IF a=27 THEN :EXIT bors:END IF
2770 IF a=192 THEN pc=pc-1:IF pc <=0 THEN LET pc=0
:END IF :END IF
2780 IF a=200 THEN pc=pc+1:IF pc >254 THEN LET pc=
255:END IF :END IF
2790 BORDER #1,(pw),(pc)
2800 NEXT bors
2810 END REPEAT bors
2820 AT #4,1,1:PRINT #4," Border " :CLS#6
2830 END DEFINE
2840 DEFINE PROCEDURE AUTHOR_OF_QCAD_QCOMP
2850 INK #6,6:STRIP#6,2:author$="" # CAD & QC
OMP copyright A.Quinn "
2860 REPEAT title
2870 a$=INKEY$(5):IF a$<> ""THEN EXIT title:END IF
2880 AT #6,0,9:PRINT #6,author$;:author$=author$(2
TO)& author$(1)
2890 END REPEAT title
2900 PAPER #6,0:CLS#6:INK #6,2
2910 END DEFINE
2920 DEFINE PROCEDURE WRITE_TO_SCREEN
2930 CLS#6:INK #6,2
2940 INPUT #6," Enter Text > ";text$
2950 OVER -1

```

```

2960 CLS#6:AT #6,0,10:PRINT #6," Move Text to Requ
ired Position & Press 'ENTER'"
2970 REPEAT loop_write
2980 IF coordinate_display_flag=1 THEN display
2990 :
3000 CURSOR x,y,-3,-5:PRINT text$;
3010 KEYBOARD_INPUT
3020 CURSOR x,y,-3,-5:PRINT text$;
3030 SELECT_INPUT
3040 IF a=10 THEN EXIT loop_write
3050 END REPEAT loop_write
3060 OVER 0:CURSOR x,y,-3,-5:PRINT text$;
3070 CSIZE #1,0,0
3080 END DEFINE
3090 DEFINE PROCEDURE DOT_GRID
3100 INK #1,2:OVER 0
3110 FOR i = 2.5 TO rx STEP 2.5
3120 FOR j = 2.5 TO ry STEP 2.5
3130 POINT i,j
3140 NEXT j:END FOR j
3150 NEXT i:END FOR i
3160 INK #1,cursor_colour:OVER cursor_flag
3170 END DEFINE
3180 DEFINE PROCEDURE SET_UP_NEW_WINDOWS
3190 SCALE 100,0,0:MODE 4
3200 cursor_colour=6:symbol_number=0:cursor_flag=-
1:g=125:ga=100:rx=122.5:ry=97.5:x=10:y=80:pw=1:pc=
4
3210 WINDOW #1,411,243,102,0:BORDER #1,(pw),(pc):P
APER #1,0:CLS#1
3220 OPEN #2,scr_:WINDOW #2,512,256,0,0:PAPER #2,0
:INK #2,0
3230 OPEN #4,con_:WINDOW #4,100,200,0,0:BORDER #4,
1,255:PAPER #4,4:CLS#4
3240 OPEN #5,con_:WINDOW #5,100,55,0,201:BORDER #5
,1,255:PAPER #5,2:CLS#5
3250 OPEN #6,con_:WINDOW #6,411,12,102,244:BORDER
#6,1,255:CLS#6
3260 END DEFINE
3270 DEFINE PROCEDURE REMOVE_GRID
3280 INK #4,2:STRIP #4,6:AT #4,11,1:PRINT #4," Rem
ove " :INK #4,0:PAPER #4,4
3290 AT #6,0,20:PRINT #6," Enter 'Y' to Remove Gri
d"
3300 KEYBOARD_INPUT:IF a$=="Y" THEN
3310 RECOL #1,0,0,0,0,4,4,6,6
3320 END IF
3330 CLS#6:AT #4,11,1:PRINT #4," Remove "
3340 END DEFINE
3350 DEFINE PROCEDURE RUBBER_BANDS
3360 CLS#6:AT #6,0,2:PRINT #6,"Rubber Bands : Move
Cursor <>?= [ ENTER ] Set : [ ESC ] Return"
3370 OVER -1
3380 x1=x:y1=y
3390 REPEAT loop
3400 a=0
3410 IF coordinate_display_flag=1 THEN display
3420 CURSOR x,y,-3,-5:PRINT "+";:LINE x1,y1 TO x,y
3430 KEYBOARD_INPUT
3440 CURSOR x,y,-3,-5:PRINT "+";:LINE x1,y1 TO x,y
3450 SELECT_INPUT
3460 SELECT ON a
3470 =27:EXIT loop
3480 =10:OVER 0:LINE x1,y1 TO x,y:EXIT loop
3490 END SELECT
3500 END REPEAT loop
3510 IF a<>27 THEN GO TO 3370
3520 CLS#6
3530 END DEFINE
3540 DEFINE PROCEDURE REMOVE_WINDOWS
3550 BORDER #4,1,0:BORDER #5,1,0:BORDER #6,1,0
3560 PAPER #4,0:PAPER #5,0:CLS#4:CLS#5:CLS#6
3570 END DEFINE
3580 DEFINE PROCEDURE SAVE_DIAGRAM
3590 INK #4,2:STRIP #4,6:AT #4,12,1:PRINT #4," Sav
e " :INK #4,0:PAPER #4,4
3600 CLS#6
3610 ENTER_DEVICE
3620 IF medium$="" THEN GO TO 3710
3630 IF ds=0 THEN :GO TO 3670
3640 IF ds=-7 THEN :BLEEP:GO TO 3600:END IF
3650 IF ds=-8 THEN :BLEEP:PRINT #6," Already exist
s 'Y' to overwrite":KEYBOARD_INPUT:IF a$=="Y" THEN

```

P+R-O-G-S

```

GO TO 3660:ELSE GO TO 3600:END IF :END IF
3660 DELETE medium$
3670 CLS#6:AT #6,0,1:PRINT #6," Please wait .....
...
3680 REMOVE_WINDOWS
3690 SBYTES medium$,131072,32767
3700 QCAD_MENU:QCAD_LOGO
3710 CLS#6:AT #4,12,1:PRINT #4," Save "
3720 END DEFINE
3730 DEFINE PROCEDURE LOAD_DIAGRAM
3740 INK #4,2:STRIP #4,6:AT #4,6,1:PRINT #4," Load
":INK #4,0:PAPER #4,4
3750 CLS#6
3760 ENTER_DEVICE
3770 IF medium$="" THEN GO TO 3840
3780 IF ds=-7 THEN :BLEEP:GO TO 3740:END IF
3790 IF ds=0 THEN :BLEEP:AT #6,0,1:PRINT #6,"Does
not exist - Press a Key":KEYBOARD_INPUT:GO TO 3750
:END IF
3800 CLS#6:AT #6,0,1:PRINT #6," Please wait .....
....
3810 REMOVE_WINDOWS
3820 LBYTES medium$,131072
3830 QCAD_MENU:QCAD_LOGO
3840 CLS#6:AT #4,6,1:PRINT #4," Load "
3850 END DEFINE
3860 DEFINE PROCEDURE JOIN_DOTS
3870 lc=0
3880 INK #4,2:STRIP #4,6:AT #4,5,1:PRINT #4," Join
":INK #4,0:PAPER #4,4
3890 AT #6,0,1:PRINT #6,"Move cursor <>?= [ Space
] [ Enter ] [ ESC ]"
3900 OVER -1
3910 LET h(0)=x:LET v(0)=y
3920 AT #6,0,46:INK #6,6:PRINT #6,"Points set >":A
T #6,0,59:PRINT #6,lc
3930 REPEAT loop
3940 IF coordinate_display_flag=1 THEN :display:EN
D IF
3950 CURSOR x,y,-3,-5:PRINT "+";
3960 KEYBOARD_INPUT
3970 CURSOR x,y,-3,-5:PRINT "+";
3980 SELECT_INPUT
3990 IF a=32 THEN OVER 0:POINT x,y:OVER -1:lc=lc+1
:h(lc)=x:v(lc)=y:AT #6,0,59:PRINT #6,lc:IF lc=19 T
HEN :LET a=10:END IF :END IF
4000 IF a=10 AND lc=2 THEN :OVER 0:LINE h(1),v(1)
TO h(1)+(x-h(1)):DIV 2,v(1) TO h(1)+(x-h(1))
DIV 2,y TO x,y:GO TO 4040:END IF
4010 IF a=10 AND lc>2 THEN :OVER 0:INK cursor_colo
ur:FOR i=1 TO lc-1:LINE h(i),v(i) TO h(i+1),v(i+1)
:NEXT i:END FOR i:BLEEP:GO TO 4040:END IF
4020 IF a=27 THEN EXIT loop
4030 END REPEAT loop
4040 INK #6,2:CLS#6:AT #4,5,1:PRINT #4," Join
":OVER cursor_flag
4050 END DEFINE
4060 DEFINE PROCEDURE ARCS_BOXES_CIRCLES
4070 CLS #6:AT #6,0,15:PRINT #6," Arcs Boxes Cir
cles - Enter Prefix"
4080 KEYBOARD_INPUT:IF a=27 THEN GO TO 4140:END IF
4090 IF a<>27 AND a<>97 AND a<>99 AND a<>98 AND a<
>65 AND a<>66 AND a<>67 THEN :BLEEP :GO TO 4080:EN
D IF
4100 IF a=97 OR a=65 THEN DRAW_A_CURVE:END IF
4110 IF a=99 OR a=66 THEN DRAW_A_CIRCLE:END IF
4120 IF a=98 OR a=67 THEN DRAW_A_BOX:END IF
4130 OVER cursor_flag
4140 CLS#6
4150 END DEFINE
4160 DEFINE PROCEDURE DRAW_A_CURVE
4170 c1=0:c=0:h1=x:v1=y:INK cursor_colour:OVER -1
4180 CLS#6:AT #6,0,8:PRINT #6," Arcs : Move Cursor
<>?= [ Space to Set end Point ]"
4190 POINT x,y
4200 REPEAT loop_curve
4210 IF coordinate_display_flag=1 THEN :display
4220 CURSOR x,y,-3,-5:PRINT "+";
4230 KEYBOARD_INPUT
4240 CURSOR x,y,-3,-5:PRINT "+";
4250 SELECT_INPUT
4260 IF a=10 THEN :OVER cursor_flag:EXIT loop_curv
e:END IF

```

```

4270 IF a=32 THEN :POINT x,y:EXIT loop_curve:END I
F
4280 NEXT loop_curve
4290 END REPEAT loop_curve
4300 CLS#6:AT #6,0,10:PRINT #6," Arcs : Press < =
[ ENTER to Set Curve & Return ]"
4310 REPEAT loop_curves
4320 KEYBOARD_INPUT
4330 OVER -1:ARC h1,v1 TO x,y,c
4340 IF a=10 THEN :EXIT loop_curves:END IF
4350 IF a=192 THEN LET c1=-1:END IF
4360 IF a=200 THEN LET c1=-.1:END IF
4370 c=c+c1
4380 ARC h1,v1 TO x,y,c
4390 NEXT loop_curves
4400 END REPEAT loop_curves
4410 OVER 0:ARC h1,v1 TO x,y,c:FILL 0:OVER cursor_
flag
4420 CLS#6
4430 END DEFINE
4440 DEFINE PROCEDURE DRAW_A_CIRCLE
4450 CLS#6:AT #6,0,8:PRINT #6," Circle : Press < =
>? [ Shift <= ] [ ENTER ] to Set"
4460 cir=0:rd=1:tilt=0
4470 REPEAT loop_circle
4480 KEYBOARD_INPUT
4490 OVER -1:CIRCLE x,y,cir,rd,tilt
4500 IF a=10 THEN :EXIT loop_circle:END IF
4510 IF a=216 THEN :rd=rd-.1:IF rd>1 THEN rd=1:EN
D IF :END IF
4520 IF a=192 THEN :cir=cir-1:END IF
4530 IF a=208 THEN :rd=rd+.1:IF rd<.1 THEN rd=.1:
END IF :END IF
4540 IF a=200 THEN :cir=cir+1:END IF
4550 IF a=196 THEN :tilt=tilt+.1:IF tilt>180 THEN
4380 ARC h1,v1 TO x,y,c
4390 NEXT loop_curves
4400 END REPEAT loop_curves
4410 OVER 0:ARC h1,v1 TO x,y,c:FILL 0:OVER cursor_
flag
4420 CLS#6
4430 END DEFINE
4440 DEFINE PROCEDURE DRAW_A_CIRCLE
4450 CLS#6:AT #6,0,8:PRINT #6," Circle : Press < =
>? [ Shift <= ] [ ENTER ] to Set"
4460 cir=0:rd=1:tilt=0
4470 REPEAT loop_circle
4480 KEYBOARD_INPUT
4490 OVER -1:CIRCLE x,y,cir,rd,tilt
4500 IF a=10 THEN :EXIT loop_circle:END IF
4510 IF a=216 THEN :rd=rd-.1:IF rd>1 THEN rd=1:EN
D IF :END IF
4520 IF a=192 THEN :cir=cir-1:END IF
4530 IF a=208 THEN :rd=rd+.1:IF rd<.1 THEN rd=.1:
END IF :END IF
4540 IF a=200 THEN :cir=cir+1:END IF
4550 IF a=196 THEN :tilt=tilt+.1:IF tilt>180 THEN
tilt=180:END IF :END IF
4560 IF a=204 THEN :tilt=tilt-.1:IF tilt<0 THEN ti
lt=0:END IF :END IF
4570 CIRCLE x,y,cir,rd,tilt
4580 NEXT loop_circle
4590 END REPEAT loop_circle
4600 OVER 0:CIRCLE x,y,cir,rd,tilt:OVER cursor fla
g
4610 CLS#6
4620 END DEFINE
4630 DEFINE PROCEDURE DRAW_A_BOX
4640 CLS#6:AT #6,0,18:PRINT #6,"Box : <>?= [ ENT
ER ] to set Box"
4650 hr=0:vr=0
4660 REPEAT loop_box
4670 KEYBOARD_INPUT
4680 OVER -1:LINE x,y TO x+hr,y TO x+hr,y+vr TO x,
y+vr TO x,y
4690 IF a=10 THEN :EXIT loop_box:END IF
4700 IF a=192 THEN hr=hr-1:END IF
4710 IF a=200 THEN hr=hr+1:END IF
4720 IF a=208 THEN vr=vr+1:END IF
4730 IF a=216 THEN vr=vr-1:END IF
4740 LINE x,y TO x+hr,y TO x+hr,y+vr TO x,y+vr TO
x,y

```

```
4750 NEXT loop_box
4760 END REPEAT loop_box
4770 OVER 0:LINE x,y TO x+hr,y TO x+hr,y+vr TO x,y
+vr TO x,y
4780 OVER cursor_flag
4790 CLS#6
4800 END DEFINE
```

Cosmic Revolution part II A. Didcock

This is the final part of our space saga of mystery, suspense and intrigue spread across several galaxies and two issues. The game is based on the popular idea of a galactic Empire divided into two warring camps - the Imperial forces and rebel fighters.

Using largely text and adventure problems, the object of the game is to lead the rebel fighters to victory and form the second

Empire. Who said history never repeats itself?

The game must be played in lower case. When you have typed it in, save it to Microdrive or disc then type WINDOW 512,256,0,0 before running it.

```
10110 INK 6:FILL 1:CIRCLE co(i,1),co(i,2),.5:FILL
0
10120 pl(i)=INT(RND(1 TO 3))
10130 FOR p=2 TO pl(i)+1:INK RND(3 TO 6): CIRCLE
co(i,1),co(i,2),p,(INT(RND(6 TO 14))/10),RND(2)
10135 col=col+9
10140 END FOR i
10150 INK 6:CSIZE 3,0:cl=49:cl$="1":OVER -1
10160 FOR i=1 TO 29 STEP 1.9:AT 16,i:PRINT cl$:cl
=cl+1:cl$=CHR$(cl): IF cl=57 THEN cl=96:END FOR i
10170 OVER 0
10180 END DEFINE
19999 :
20000 DEFINE PROCEDURE initialise
20010 DIM des$(15,55):DIM pl(15):DIM co(15,2):DIM
name$(15,15)
20015 DIM nam1(30):DIM cat$(30,15):DIM cat1$(12,55
):DIM ar(15)
20016 DIM f(16): tot_h=0:tot_c=0: DIM dep(15):gol=
1:end_g=0
20020 RANDOMISE
20030 RESTORE 32000
20035 FOR i=1 TO 30:READ cat$(i):END FOR i
20040 FOR i=1 TO 15
20050 a1=INT(RND(1 TO 30)):IF nam1(a1)<>0 THEN
GO TO 20050
20060 nam1(a1)=1:name$(i)=cat$(a1)
20070 END FOR i
20080 RESTORE 32030
20090 FOR i=1 TO 12:READ cat1$(i):END FOR i
20100 FOR i=1 TO 15
20110 a1=INT(RND(1 TO 12))
20120 des$(i)=cat1$(a1)
20122 rn=INT(RND(25 TO 95))
20125 IF a1<>1 AND a1<>7 AND a1<>8 THEN ar(i)=rn:
ELSE rn=0
20126 f(i)=a1
20127 IF a1=4 OR a1=6 OR a1=12 THEN tot_h=tot_h+r
n: ELSE tot_c=tot_c+rn
20130 END FOR i
20135 IF tot_h<200 THEN GO TO 20010
20140 year=65891.74
20150 prob=INT((100/(tot_h+tot_c))*tot_h)
20160 devel_h=0
20170 base=INT(RND(1 TO 15)):IF f(base)<>1 AND f(b
ase)<>2 AND f(base)<>7 AND f(base)<>8 AND f(base)<
>9 AND f(base)<>10 THEN GO TO 20170
20998 END DEFINE initialise
20999 :
21000 DEFINE PROCEDURE f_level
21005 BEEP 1000,5
```

```
21010 PAPER 0:BORDER 5,5:CLS
21020 INK 2,4:CSIZE 3,1:AT 0,7:PRINT "COSMIC REVOL
UTION":CSIZE 2,0
21030 INK 7
21040 AT 3,2:INPUT "PLEASE ENTER SKILL LEVEL (1 TO
4)":lev
21050 BEEP 1000,20
21060 IF lev<1 OR lev>4 THEN GO TO 21010
21065 CLS
21067 INK 2,4:CSIZE 3,1:AT 0,7:PRINT "COSMIC REVOL
UTION":CSIZE 2,0
21070 INK 6:UNDER 1:AT 2,0:PRINT "THE CURRENT SITU
ATION":UNDER 0
21080 INK 4:AT 4,2:PRINT "NAME":AT 4,19:PRINT "DES
CRIPTION"
21090 INK 2
21100 FOR i=1 TO 15
21105 IF i/2=INT(i/2) THEN INK 3:ELSE INK 2
21110 AT i+5,0:PRINT name$(i)
21120 IF f(i)<>10 AND f(i)<>9 AND f(i)<>1 AND f(i
)<>2 AND f(i)<>8 AND f(i)<>7 THEN AT i+5,17:PRINT
des$(i):ELSE AT i+5,17:PRINT "NO INFORMATION"
21140 END FOR i
21150 INK 7:AT 23,9:PRINT "PRESS ANY KEY TO PLAY"
21160 PAUSE 40000
21170 BEEP 1000,10
21180 END DEFINE
21999 :
22000 DEFINE PROCEDURE end_game
22010 PAPER 0:BORDER 5,5:CLS
22020 CSIZE 3,1:INK 2,6:AT 0,1:PRINT "THE EMPIRE H
AS BEEN RE-FORMED"
22030 CSIZE 2,0:INK 2
22040 AT 8,2:PRINT "THE SECOND EMPIRE HAS BEEN FOU
UNDED BY"
22045 INK 3
22050 IF tot_h>tot_c THEN
22060 AT 10,11:PRINT "THE REBEL FORCES"
22070 INK 5:FLASH 1:AT 12,15:PRINT "WELL DONE":FL
ASH 0
22080 END IF
22090 IF tot_c>tot_h THEN
22100 AT 10,10:PRINT "THE IMPERIAL FORCES"
22110 INK 5:FLASH 1:AT 12,12:PRINT "YOU HAVE FAIL
ED":FLASH 0
22120 END IF
22121 INK 6:AT 16,0:PRINT "IN WHICH SYSTEM IS THE
SECOND FOUNDATION?"
22122 INK 4:INPUT FOUND$
22123 IF name$(base)=FOUND$ THEN INK 7,2:AT 19,12:
PRINT "YOU ARE CORRECT"
22124 IF name$(base)<>FOUND$ THEN INK 7,2:AT 19,4:
PRINT "YOU ARE WRONG, IT WAS ON ";name$(base)
22130 INK 7:CSIZE 3,0:AT 22,2:PRINT "PRESS ANY KEY
TO PLAY AGAIN"
22140 PAUSE 40000
22150 BEEP 10000,10
22160 END DEFINE
22160 END DEFINE
31999 :
32000 DATA "Xantor","Capri","Alce","Cor Caroli","M
enta","Canopus","Baltair","Phakt","Rantor","Thuban
"
32010 DATA "ken Tor","Eltanin","Danko","Zibal","Di
dcock's Star","Pollux","Sarin","Nihal","Frontus","
Heka","Ignata"
32020 DATA "Sirrah Alpha","Sirrah Beta","Antares",
"Qaunta","Gigantu","Hinter","Janx","Psion","Lacert
a","Optika"
32030 DATA "System UNINHABITED by intelligent
ent life.," "System's INHABITANTS unknown."
32040 DATA "An IMPERIAL out post.," "A REBEL out po
st."
32050 DATA "An IMPERIAL colony.," "A REBEL colony."
32060 DATA "The System is devoid of all LIFE."
32070 DATA "System INHABITED by low forms of life."
"
32080 DATA "System INHABITED by an intelligent
ent species.," "The Whole system is internally gove
rned."
32090 DATA "An IMPERIAL base.," "A REBEL base."
```

Multiplication Quiz Leslie Fahidy

Following our appeal for educational programs, so if you have educational software, we received this written any educational software program which helps to teach you think might be suitable, send children their multiplication table to The Progs. We are still looking for educational software.

```

1070 MODE 8:CSIZE 1,1:PAPER 2:INK 7:      CLS
1080 AT 5,11:PRINT"QUIZ":PAUSE 50
1090 PAPER 6:INK 1:CLS
1100 PRINT"Which table <1..12>"
1110 PRINT:PRINT"Or <A>ny table"
1120 PRINT:PRINT"Input your choice.."
1130 PRINT:INPUT choice$
1140 IF choice$="1" AND choice$<=
specific_tables      (choice$)
1150 IF choice$="A" OR choice$="a" THEN any
_table:ELSE GO TO 1090
1160 REMark *** specific table ***
1170 DEFINE PROCEDURE specific_tables (choice$)
1180 LOCAL a$,time_now$,end_time$, correct_
marker,mark,number_1, number_2
1190 DIM number(10)
1200 a$=DATE$:time_now$=a$(16 TO 20)
1210 correct_marker=0
1220 FOR counter=1 TO 10
1230 CLS:mark=0
1240 number_1=choice$:number_2=RND (1 TO 1
2)
1250 FOR check=1 TO counter
1260 IF number_2=number(check) THEN mark=1
:EXIT check
1270 END FOR check
1280 IF mark=1 THEN LET mark=0:GO TO 1240:EL
SE number(check)= number_2
1290 AT 5,7:PRINT number_1;" "; "x ";nu
mber_2;" = ":AT 5,19: PRINT "?"
1300 AT 5,19:INPUT answer$
1310 IF answer$<"0" OR answer$>"999" THEN GO
TO 1290
1320 IF answer$=number_1*number_2 THEN co
rrect_marker= correct_marker+1:goo
d_news: correct:ELSE bad_news:wrong:
teach number_1,number_2:wait
1330 END FOR counter
1340 CLS
1350 a$=DATE$:end_time$=a$(16 TO 20)
1360 minutes=end_time$(1 TO 2)-
$(1 TO 2) time_now
1370 time_elapsed=60*(end_time$(1 TO 2)-time_
now$(1 TO 2))+end_time$ (4 TO 5)-time_now$(4
TO 5)
1380 faces(correct_marker)
1390 AT 9,1:PRINT"You took "!
apsed!" seconds.!" time_el
1400 STOP
1410 END DEFINE
1420 REMark *** Any table ***
1430 DEFINE PROCEDURE any_table
1440 LOCAL a$,time_now$,end_time$, correct_
marker,mark
1450 DIM n3(10),n4(10)
1460 a$=DATE$:time_now$=a$(16 TO 20)
1470 correct_marker=0
1480 FOR counter=1 TO 10
1490 CLS
1500 number_3=RND(1 TO 12)
1510 mark=0
1520 FOR check=1 TO counter
1530 IF number_3=n3(check) THEN mark=1
:EXIT check
1540 END FOR check
1550 IF mark=1 THEN LET mark=0:GO TO 1500:EL
SE n3(counter)=number_3
1560 number_4=RND(1 TO 12)
1570 mark=0
1580 FOR check=1 TO counter
1590 IF number_4=n4(check) THEN mark=1
:EXIT check
1600 END FOR check
1610 IF mark=1 THEN LET mark=0:GO TO 1560:EL
SE n4(counter)=number_4
1620 AT 5,7:PRINT number_3;" "; "x ";n

```

```

umber_4;" = ":AT 5,19: PRINT"?"
1630 AT 5,19:INPUT answer$
1640 IF answer$<"0" OR answer$>"999" THEN GO
TO 1620
1650 IF answer$=number_3*number_4 THEN co
rrect_marker= correct_marker+1:goo
d_news: correct:ELSE bad_news:wrong
:teach number_3,number_4:wait
1660 END FOR counter
1670 CLS
1680 a$=DATE$:end_time$=a$(16 TO 20)
1690 minutes=end_time$(1 TO 2)-
$(1 TO 2) time_now
1700 time_elapsed=60*(end_time$(1 TO 2)-time_
now$(1 TO 2))+end_time$ (4 TO 5)-time_now$(4
TO 5)
1710 faces(correct_marker)
1720 AT 9,1:PRINT"You took "!time_elapsed!" seconds.!"
1730 STOP
1740 END DEFINE
1750 DEFINE PROCEDURE correct
1760 AT 7,8:INK 2:FLASH 1:PRINT "Well do
ne!":PAUSE 100:FLASH 0: INK 0
1770 END DEFINE
1780 DEFINE PROCEDURE wrong
1790 AT 7,5:INK 2:FLASH 1:PRINT "No. Wai
t for help!":PAUSE 100 :FLASH 0:INK 0
1800 END DEFINE
1810 REMark sound - if wrong
1820 DEFINE PROCEDURE bad_news
1830 FOR j=1 TO 255
1840 BEEP 500,j
1850 END FOR j
1860 END DEFINE
1870 REMark sound if correct
1880 DEFINE PROCEDURE good_news
1890 FOR j=100 TO 4000 STEP 500
1900 BEEP 5000,j:PAUSE 5
1910 END FOR j
1920 END DEFINE
1930 REMark draw faces
1940 DEFINE PROCEDURE faces(count)
1950 CLS
1960 AT 1,1:PRINT"You got ";count;" of them right,"
1970 increment=0:radius=7
1980 FOR n=1 TO count
1990 CIRCLE n*radius+1+increment,60 ,radius
2000 ARC n*radius+1+increment- 2.6, 58 TO n
*nradius+1+increment+2.6 ,58,PI
2010 POINT n*radius+1+increment-2, 62:POIN
T n*radius+1+increment+ 2,62
2020 increment=increment+radius+2
2030 END FOR n
2040 AT 5,1:PRINT"and ";10-count;" of the m wrong."
2050 increment=0
2060 FOR n=1 TO 10-count
2070 CIRCLE n*radius+1+increment,20 ,radius
2080 ARC n*radius+1+increment- 2.6, 16 TO n
*nradius+1+increment+2.6 ,16,-PI
2090 POINT n*radius+1+increment-2, 22:POIN
T n*radius+1+increment+ 2,22
2100 increment=increment+radius+2
2110 END FOR n
2120 END DEFINE
2130 DEFINE PROCEDURE teach(n1,n2)
2140 CLS:CSIZE 0,0
2150 AT 1,1:PRINT"To work out "!n1! " x "!n2
!":PRINT
2160 FOR j=1 TO n1
2170 FOR k=1 TO n2
2180 PRINT "*";
2190 END FOR k:PRINT
2200 END FOR j
2210 AT 5,17:PRINT"There are ";n1:AT 6,17:PRI
NT"lots of ";n2;"'s": AT 7,17:PRINT"If you
count all"
2220 AT 8,17:PRINT"the stars, you":AT 9,17:PRI
NT"will find that":AT 10 ,17:PRINT"there are "
;n1*n2:AT 11,17:PRINT"of them."
2230 AT 12,17:FLASH 1:PRINT"so":AT 14,17:UN
DER 1:CSIZE 2,1:PRINT n1 ; " x ";n2;" = ";n1*n2
:FLASH 0: UNDER 0:CSIZE 0,0
2240 AT 17,17:PRINT"Press any key."
2250 CSIZE 2,1
2260 END DEFINE
2270 DEFINE PROCEDURE wait
2280 a$=""
2290 REPEAT loop
2300 a$=INKEY$
2310 IF a$<>" THEN EXIT loop
2320 END REPEAT loop
2330 END DEFINE

```

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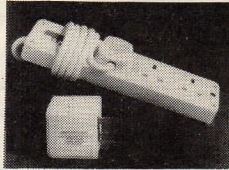
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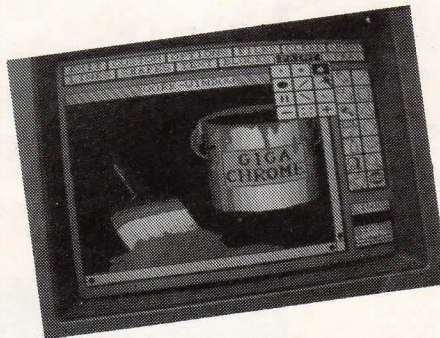
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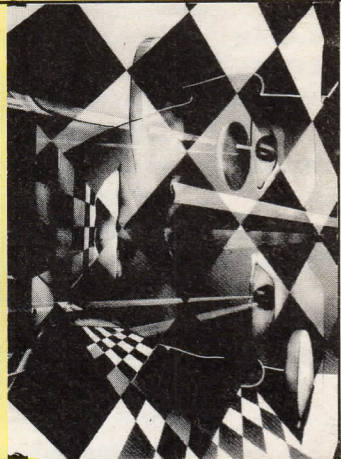
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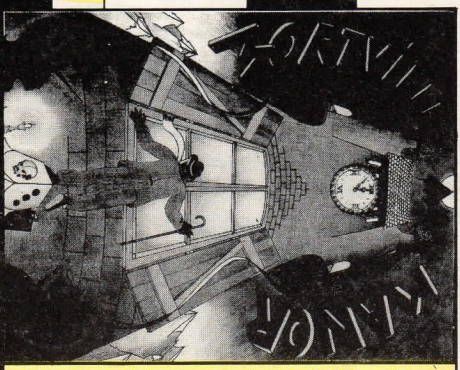
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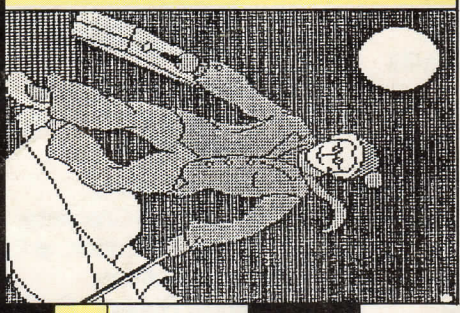
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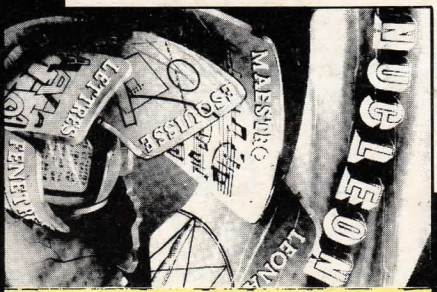
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